

PRACTICAL HELPS FOR FARM AND HOME



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A Collection of
Practical Ideas, Use-
ful Information and
Frequently - Used
Reference Data for
Use on the Farm and
in the Home



Compiled and Published by

**THE AGRICULTURAL EXTENSION BUREAU OF
REPUBLIC STEEL CORPORATION**

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FARM MECHANICS SECTION

Making Tools Easy to Find

We have all had experience with lost tools when working in the fields or around the house or barn. You can save a lot of time and temper—as well as tools—by painting the handles of wrenches, hammers, saws, shovels, hoes, etc. a bright yellow or orange. These colors are easily seen, even from great distances, and tools will be found easily, even when left lying in grass or weeds.

Be sure to use a good quality of paint or enamel that will dry hard.

This plan also makes it easier to identify your own tools and reduces losses through loans of tools to others.

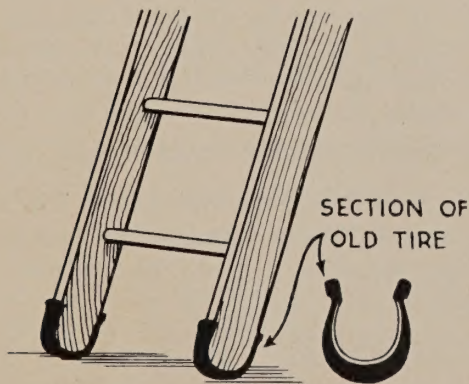
Encouraging Care of Tools

It is a good plan to paint an outline of the tools on the wall in the position they hang in order to encourage everyone who uses them to replace them properly.

Renewing Old Carpenter Square

If your carpenter square is rusty, dull and hard to read, the following renewing method is recommended. Clean thoroughly using steel wool to remove excess or loose rust. Give the whole square a coat of white paint, then before it has dried, wipe paint off leaving the paint in the stamped numbers and number lines so they will remain white and easy to read. After remaining paint has dried, oil square thoroughly to prevent further rusting.

Avoid Ladder Slipping



When using a ladder on hard or slippery surfaces, some method of holding the ladder should be provided to prevent accidents. Sections of old tire casings, attached to the foot of the ladder as illustrated, will prevent it from sliding. These rubber pads, a little wider than the sidebars of the ladder, may be either nailed or screwed in position.

Prevent Rope Ends Fraying

When you knot the end of a rope to prevent it from fraying, dip it into glue and allow it to dry before using. This will keep the knot from loosening. If the rope is to be used where it is likely to get wet use a good grade of water-proof glue.

Hint For Filing Saws

When filing any kind of a saw, smoke the teeth first by passing them through the flame of a candle. This will make it easy to see the fresh file cut and to hold the file at the right angle for the job.

Protecting Padlocks

Rain and snow falling on padlocks used on the outside of buildings cause rusting and freezing, making them difficult to open. This trouble can be eliminated by cutting a piece from an old inner tube and tacking it on the side of the building so that it will hang down over the lock.

Keeping Hammer From Falling

When you are working on a ladder or scaffold, or on a well curbing, dropping of the hammer not only causes inconvenience but also might endanger other persons or livestock. To avert this, drill a small hole near the end of the hammer, insert a thin strip of rawhide and make a loop in the rawhide large enough to go over the wrist. This loop can also be used for hanging the hammer up when it is not in use.

Driving Tacks in Tight Places

If you have difficulty driving a tack in a tight place or if it is too small to hold easily, try this idea. Stick the tack through a piece of paper, holding the paper so that the tack is in position for hammering. When the tack has been driven far enough to take hold, remove the paper and drive it home.

To Preserve Wagon Box Floors

To preserve and lengthen the life of the bottom of your wagon box or truck body, give it an occasional coat of pure linseed oil. The oil should be heated to the boiling point and applied with a paint brush while it is still hot. A good heavy coat should be applied and left to stand several days before the truck or wagon is used. This will not only preserve the bottom of the box but it will also make it hard and smooth so that there will be less danger of damaging it when shoveling from the box.

Precautions When Working With Electricity

1. Never do repair work on a live circuit. Disconnect cords and appliances from outlets before working on them. Always consider a circuit "live" until you have "killed" it yourself by opening the switch and removing the fuses.
2. When renewing fuses in a "live" or "hot" circuit, use one hand only and always stand on a dry board or other insulating material. Do not attempt to replace fuses in the dark, put fingers into the fuse socket, or touch fuse clips. If possible, first pull the switch ahead of fuse.
3. When using a trouble lamp, never allow the hands or fingers to touch bare contacts. Keep them on the insulated wire.
4. Never allow the body to become a part of an electric circuit; that is, from hand or head to the feet. The current tends to flow from one wire to another or to ground. Insulate yourself from possible paths.
5. Never work with an electric circuit or cord when standing on wet ground, wet floors, or when in water.
6. Avoid exposed wires and ends of wires not connected. Always tape them well.
7. Never touch any lamp, appliance, or extension cord when in the bath tub or standing in water.
8. If a shock is received from an appliance or motor, the cause should be determined at once and remedied.
9. It is dangerous to experiment with or use home-made appliances. For assurance of safety, buy appliances carrying the label of the Underwriters' Laboratories or which appear in their published lists.

Proper Size Fuses

Fuses provide protection against short circuits and overloaded wires in the electrical system.

Do not use pennies or wire to bridge circuits. If fuses with the proper rating burn out, there is too much current on the wires, and you should have a competent electrician check over the system to avoid loss and accident.

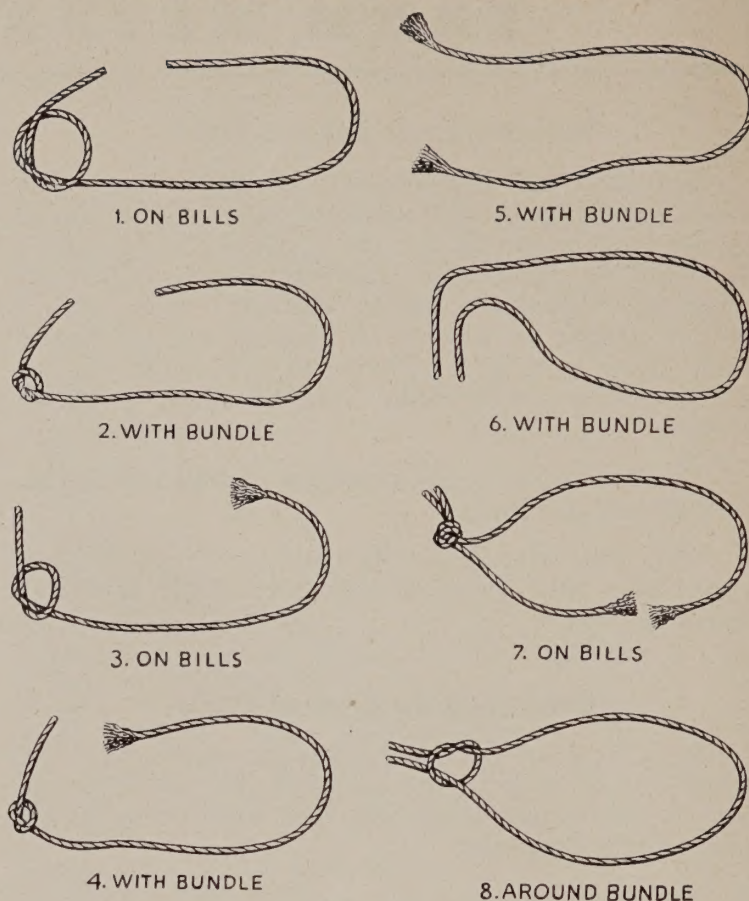
Wire Size (Copper)	Fuse Rating Amperes	Capacity Amperes
No. 18	3	3
No. 16	3	6
No. 14	15	15
No. 12	20	20
No. 10	25	25
No. 8	35	35
No. 6	50	50

Electrical Repair Outfit

The following tools should be kept handy for making electrical repairs.

1. A sharp pocket knife (fair size).
2. One screw driver with wooden handle.
3. One pair of side cutting pliers.
4. Neutral soldering paste or flux.
5. A stick or length of solder.
6. An electric, or other type, soldering iron.
7. A gasoline torch, if other type soldering iron is used.
8. A 110-220 volt trouble lamp.
9. One roll each of electrician's rubber and friction tape.

Grain Binder Trouble Guide



The illustrations show causes of bundle tying trouble with the grain binder. Suggested remedies follow:

- No. 1—Twine tension too tight at the needle, or twine holder disc tension too loose. Adjust the twine tension so it is about 8 pounds at the needle eye. If this does not remedy the trouble, tighten the disc twine holder tension slightly, not more than $\frac{1}{4}$ turn.
- No. 2—Disc twine holder tension too loose. May also result from a worn knotter bill pinion, a worn disc, twine tension too loose at needle, or discs slightly out of time.
- No. 3—Disc twine holder tension too tight; loosen $\frac{1}{4}$ turn or less. Also from twine tension too tight at the needle; try twine tension at needle first.
- No. 4—Disc twine holder tension too tight.
- No. 5—Disc twine holder much too tight.
- No. 6—Knotter bill cam spring too loose, bill roller or cam worn, or shoulder worn off small knotter bill.
- No. 7—Knotter bill too tight or bundle too loose.
- No. 8—Disc may be out of time. Usually needle trouble, such as badly worn eye, needle bent, too slow, or dull or rusty so it carries straw or weeds into the knotter or discs.

Cheap, short fiber twine is a common cause of frequent binder troubles. Use high quality long fiber twine.

Suggestions for Tractor Operation

1. Always keep the oil in the crank case clean and free from sediment.
2. Clean out the distributor on the magneto at least once every 30 days, using a soft cloth and removing any carbon, dust or dirt that may have accumulated.
3. Merely follow instructions regarding care of the magneto. Don't try to re-build it to suit your ideas.
4. Be sure your spark plugs are clean before "fussing" with the magneto.
5. Don't allow wiring to become wet or oil-soaked.
6. Watch your valve stems. "Sticky" valve stems prevent valves setting properly.
7. If spark plugs are changed, be sure they are of the proper length to reach into the cylinder.
8. Don't "put off" repairing or adjusting worn parts.
9. In case of trouble, examine the compression, mixture and spark before "tearing down" the tractor.
10. Cold weather starting troubles may be remedied by removing and warming the spark plugs.
11. Think first, then use the wrench—if necessary.
12. Never make an adjustment unless you know the reason for doing so.
13. Don't "crank and crank and crank." Look around for the cause if tractor refuses to start.
14. Don't race the motor—it is hard on all wearing parts in crank case and cylinders.
15. Be sure you have plenty of fuel, oil and water before going in the field. This will save you needless delays and may be the means of preventing damage to the tractor.
16. Don't advance the spark or throw open the carburetor lever too quickly. This is also hard on the motor.
17. Don't forget grease fittings. Grease is cheaper than repairs and the time required to make replacements.
18. Don't run the tractor over ditches and rough places full speed. A little slowing down may save a break.
19. Be sure your spark plugs are tight and that the porcelains are not cracked.
20. An ounce of prevention saves big repair bills. Look your motor over carefully before going into the field.
21. Don't allow any of the bearings to pound. If connecting rod shaft bearings are loose, remove crank case cover and take up the lost motion. It is dangerous to run the motor with any pound in these bearings.
22. When taking off any gears be sure to mark them with relation to the shaft and other meshing gears so they can be replaced in exactly the same position.
23. Remember that it is the empty tank like the unloaded gun that is most dangerous. It is impossible to explode gasoline liquid, but a tank which is "empty" will be full of air mixed with a certain amount of gasoline vapor which is very explosive and will blow the tank into fragments if ignited.
24. Don't use too much leverage when screwing in spark plugs. A broken or cracked porcelain may cause lots of trouble.
25. If water is to be changed or added, allow the motor to cool down somewhat before putting in fresh water. Otherwise sudden contraction may injure the cylinder or water jacket.
26. A hot soda solution used occasionally in the cooling system will remove the dirt, oil, or grease that may have accumulated there.
27. Imperfect mixture causes a dark brown smoke and too much lubricant causes a light gray smoke at the exhaust. Either indicates waste.
28. Hissing is sometimes caused by a loose or broken spark plug. Other causes may be a loose valve cap or defective piston ring.
29. Knocking generally indicates a loose connecting rod. Tighten it up—a "knocker" always causes trouble. "Safety First" saves time and money.
30. Be sure gear shift lever is in neutral before cranking your motor.
31. Never "suppose" anything around a tractor. Be positive that every bearing is properly oiled, that all bolts are tight, that water circulates freely. In cold weather, be sure you have drained the cylinders before leaving the tractor.
32. Don't fill the gasoline tank with the engine running.
33. Don't run the tractor at its extreme high speed at any time the first week you have it.
34. Don't put oil in the lubricator without first examining the fine wire strainer and making sure that it is free from dirt and lint which would stop or reduce the oil flow.
35. Don't allow the clutch to engage suddenly.
36. Don't prime the carburetor too much in warm weather.
37. Don't attempt to shift gears without first disengaging the clutch.
38. Don't attempt to shift gears until the tractor comes to a full stop.
39. Don't neglect keeping the radiator filled with water.
40. Don't leave water in the radiator in freezing weather.
41. Don't let the fan belt become loose so that the fan will not revolve at its full speed.
42. Don't attempt to start the engine with the spark advanced.
43. Don't fail to lubricate the motor or neglect to lubricate all other parts.
44. Very often trouble with the carburetor can be eliminated by removing and cleaning the pipe line. Usually there is a strainer at the base of the carburetor, or at some point in the pipe line. This strainer or trap frequently becomes clogged to such an extent that the carburetor does not obtain a sufficient flow of gasoline. Before changing the adjustment of the carburetor, it is advisable to determine whether there are any obstructions and remove them from the line.

Tractor Safety Rules

1. Be sure the gear shift lever is in neutral before cranking the engine.
2. Always engage the clutch gently, especially when going up a hill or pulling out of a ditch.
3. When driving on highways, or to and from fields, be sure that both wheels are braked simultaneously when making an emergency stop.
4. Always ride on seat or stand on platform of tractor. Never ride on drawbar of tractor or drawn implement.
5. When tractor is hitched to a stump or heavy load, always hitch to drawbar and never take up the slack of chain with a jerk.
6. Be extra careful when working on hill-sides. Watch out for holes or ditches into which a wheel may drop and cause tractor to overturn.
7. Always keep tractor in gear when going down steep hills or grades.
8. Reduce speed before making a turn or applying brakes. The hazard of overturning the tractor increases four times when speed is doubled.
9. Always drive tractor at speeds slow enough to insure safety, especially over rough ground or near ditches.
10. Always stop power take-off before dismounting from tractor.
11. Never dismount from tractor when it is in motion. Wait until it stops.
12. Never permit persons other than the driver to ride on tractor when it is in operation.
13. Never stand between tractor and drawn implement when hitching. Use an iron hook to handle drawbar.
14. Do not put on or remove belt from belt pulley while the pulley is in motion.
15. Should motor overheat, be careful when refilling radiator.
16. Never refuel tractor while motor is running or extremely hot.
17. When tractor is attached to a power implement, be sure that all power line shielding is in place.

(Prepared by the Farm Safety Committee of the Farm Equipment Institute.)

Care of Idle Machinery

The watchword of the farmer in regard to his machinery should be, "Good machinery, properly oiled, repaired, adjusted, and well housed."

When a machine is left standing for a short period, the working parts that are likely to be damaged by rust should be greased or covered. At the end of the season, whether a machine is to be housed or not, it should be thoroughly cleaned and all the bearings and bright surfaces oiled or greased.

Before putting a machine away, go over it carefully for broken or badly worn parts, tag them, and order the new parts at once.

Machinery to be properly housed must be placed on a floor or on boards in a closed, dry shed to which stock does not have access. Unfortunately, housing often means merely putting machinery in an open, leaky shed with a dirt floor, where it serves as a chickenroost. It would be just as well off standing out in the open. Some

machinery, however, can be stored outside if properly cared for. Corn cultivators, disks, drag harrows, and even plows can be left outside if the polished parts that can be taken off are removed and put in a dry place, the other polished parts greased, and the rest of the machine given a coat of paint when it is needed.

Investigations from several states indicate that the life of farm machinery is practically doubled by proper housing. Attention to this point alone would mean a tremendous saving to farmers and, in addition, would increase the ease with which a machine is adjusted and the quality of work it does.

(From "Farm Machinery, Its Purchase, Care, Operation and Adjustment," University of Illinois.)

Types of Electric Motors

All single phase motors operate on essentially the same principle, and differ chiefly in their ability to start loads, or in starting torque. For different uses various starting torques are needed. A number of different starting methods are used. Single phase motors have been named after these different methods.

Six different types of motors are commonly manufactured for single phase alternating current. They are:

1. Split-phase
2. Capacitor start-induction run
3. Capacitor run
4. Repulsion start-induction run
5. Repulsion induction
6. Universal

The first five types have essentially the same operating characteristics after starting, but differ in starting ability. The capacitor run motor is a fine new type of motor without starting winding or centrifugal switch, but it is more expensive. It can be used on a cream separator without a clutch at a considerable saving. The sixth type, the universal, is a high speed motor which operates on either direct or alternating current and is used chiefly for vacuum cleaners, food mixers, and similar appliances.

Motor Sizes and Types

	Motor sizes		Motor type— See above
	Horse-power	Most used	
Cream separator	1/6 to 1/4	1/6	3 or 5
Washing machine	1/6 to 1/4	1/4	1
Fanning mill	1/4 to 1/2	1/4	4
Fruit and vegetable graders	1/4 to 1/2	1/4	4
Sausage grinder	1/4 to 1/2	1/4	4
Milking machine	1/4 to 1	1/3 to 1/2	4
Corn sheller (1 hole)	1/4 to 1/3	1/4	4
Small concrete mixer	1/4 to 1/2	1/2	4
Emery wheel	1/4 to 3/4	1/4	4
Feed grinder	1 to 10	5	4
Grain elevator	2 to 5	3	4
Ensilage cutter	5 to 10	7 1/2	4
Hay hoist	3 to 10	5	4
Feed mixer	3 to 7 1/2	5	4
Wood saw	5 to 7 1/2	5	4
Churn	1/6 to 1/4	1/4	4
Pump jack	1/4 to 1/2	1/3	4
Drill press	1/8 to 1/2	1/4	4

From Bulletin P13 (New Series) Iowa State College.

FENCING SECTION

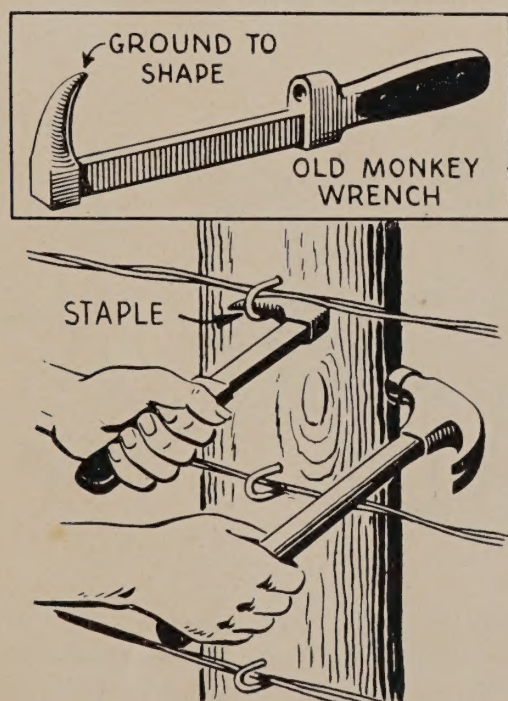
For complete information on fence building, refer to the 16-page book, "How to Erect Farm Fence", published by Republic Steel Corporation.

Removing Old Fence Wires From Wood Posts



If fence is to be removed from old wood posts, a cold chisel and hammer will enable you to quickly remove the old fence wires as illustrated. Always wear heavy gauntlet type gloves to avoid injury to the hands and arms.

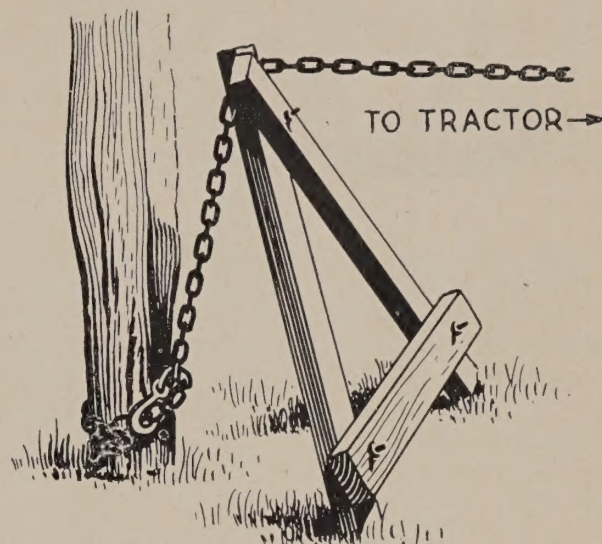
Staple Puller Made From Old Wrench



The illustration shows a very efficient staple puller which can be made from an old monkey wrench in a few minutes.

Merely remove the lower or movable jaw and screw of the wrench and grind the upper or fixed jaw to a point on a grindstone or emery wheel as shown. The lower illustration shows how the puller is used.

Easily Constructed Post Puller



A simple but effective post puller can be made from three pieces of 2" x 4" or 2" x 6" bolted together to form a triangle as shown. Hook a chain around the bottom of the post and pass it over the apex of the triangle. A slight pull by horse or tractor will quickly remove the post.

Circus-Type Post Puller

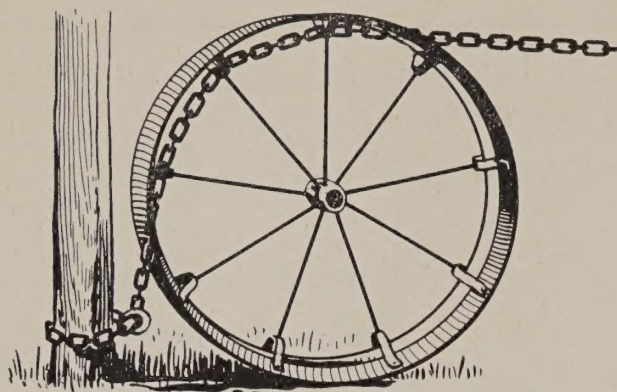


Circus men who have lots of posts to pull quickly when the circus finishes its night performance use a device like that pictured here. You can easily make such a puller out of scrap materials to be found around any farm.

An old pair of wheels and an axle provide a suitable truck. A short axle is to be preferred or a piece of round steel of suitable diameter can be used. A heavy piece of hardwood is bolted to the axle and an old wagon pole is used as a lever.

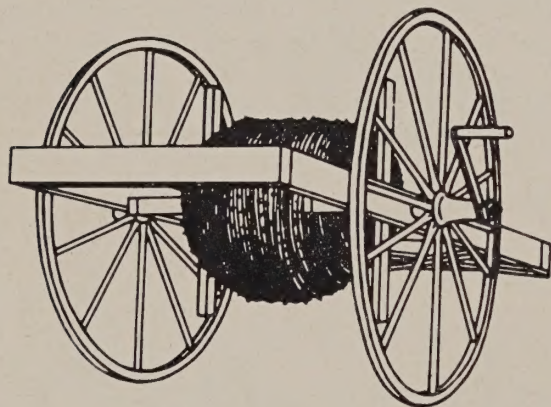
The operation of the rig is very simple. A chain is wrapped around the post near the ground and hitched over the end of the lever. By bearing down on the other end of the lever, the post is withdrawn with very little pressure.

A Simple Post Puller



If you have an old planter wheel and a log chain handy, it's easy to make this simple but very effective post puller. Wrap the chain around the bottom of the post and place it between the two sections of the split tread. A slight pull by a tractor or team of horses usually brings the post out of the ground.

Reel For Old Barbed Wire



Here is a handy rig for safely handling old barbed wire when removing or building new fences.

You can use any kind of old wheels but buggy wheels are to be preferred because they are lighter. The size makes no difference as long as the fingers of the reel clear the ground by about six inches.

Gas pipe or bar steel about one inch in diameter can be used for the axle. Holes are drilled into the axle for the pins which fasten the reel and crank in position, thus permitting the reel to turn when the crank is turned.

The frame of the rig is made of 2" x 6" planks spiked together as shown. Holes are drilled in the middle of the side planks to accommodate the axle. A plow clevis fastened to the front end of this frame forms a guide for the wire.

To roll up the barbed wire it is simply necessary to wrap one end several turns around the reel and then turn the crank. The rig rolls forward as the wire is wound on the reel.

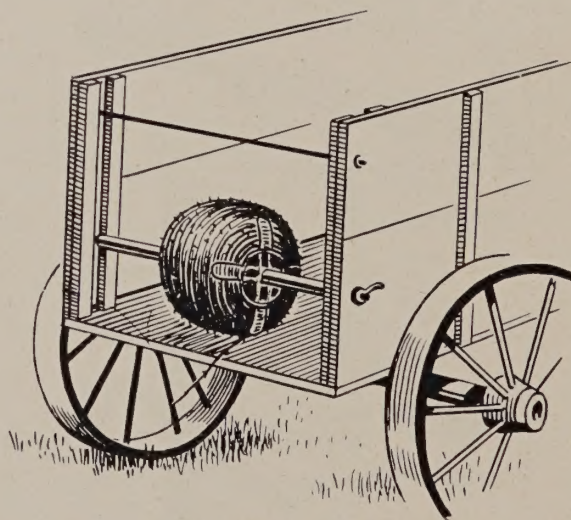
Barbed Wire Handler



Here is a device which makes it safe and easy to handle barbed wire. It consists of a framework of two pieces of 2" x 4" about four feet long, spaced about 12 inches apart. The cross pieces may be made from 1" x 2" boards. Drill holes in each end of the 2" x 4" pieces to permit a piece of half inch gas pipe to be inserted. The pipe at the top serves as a handle and that at the bottom as an axle for the barbed wire reel.

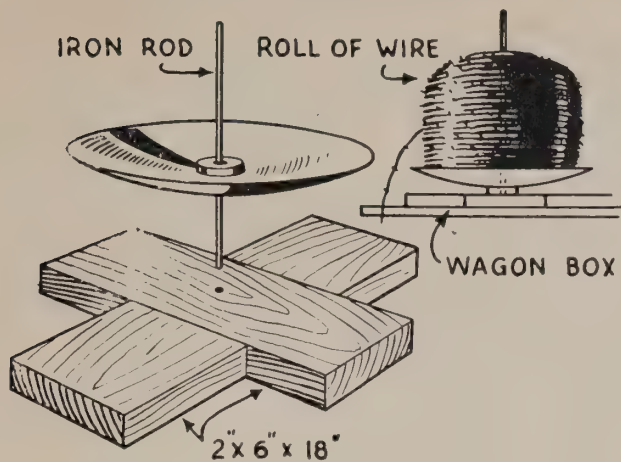
Insert the barbed wire reel so that the wire will unroll from the bottom. All you have to do is to pull on the handle as shown in the illustration and you will be able to lay your barbed wire easily and without danger of anyone getting scratched or injured. It's much easier than the old-fashioned way of unrolling the reel from a pole carried by two men.

Barbed Wire Stringer



An easy way to string barbed wire from the back of a wagon, truck or trailer is shown in the illustration. Use a piece of one inch gas pipe the same length as the width of the inside of the wagon or truck box. Pass the pipe through the spool. Then slide the end gate tie rod through the lower hole in the side board of the box, through the pipe and out through the lower hole in the opposite side board. Tighten the tie rod in the same manner as when the end gate is in position. The barbed wire will pay out freely as the wagon or truck moves ahead and there is no danger of torn clothes and scratches.

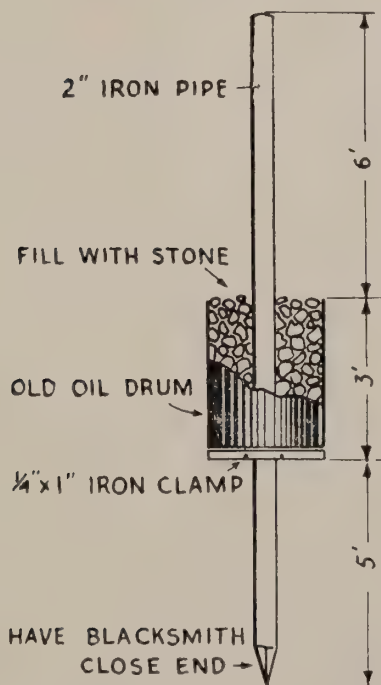
Unroller For Barbed Wire



The device illustrated here makes it easy to unreel barbed wire or stranded plain wire from the back of a wagon, truck or trailer.

An old disc, two pieces of 2" x 6" about eighteen inches long and a piece of one inch rod or $\frac{3}{4}$ inch pipe are the only materials required. Make a cross of the two pieces of 2" x 6", drill a hole in the center to take the pipe or rod and assemble as shown.

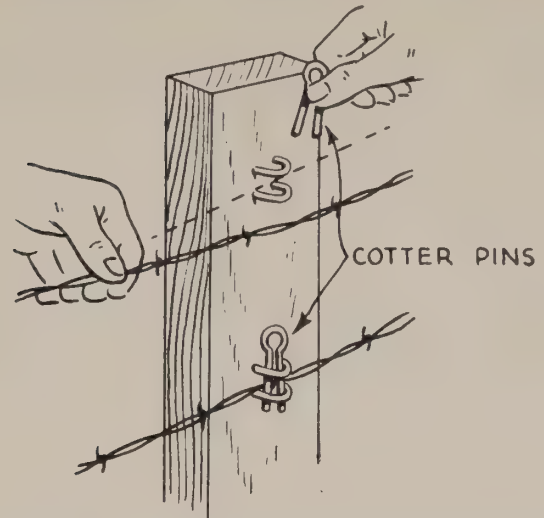
Posts For Fences Extending Into Lakes or Streams



Farmers having pastures along lakes or streams frequently have trouble keeping fence posts in place where the fence extends out into the water.

A post constructed as shown in the illustration will remain fixed throughout the year and will withstand the pressure of ice in the spring. The oil drum filled with stones will give the post the necessary rigidity to withstand almost any strains ordinarily encountered.

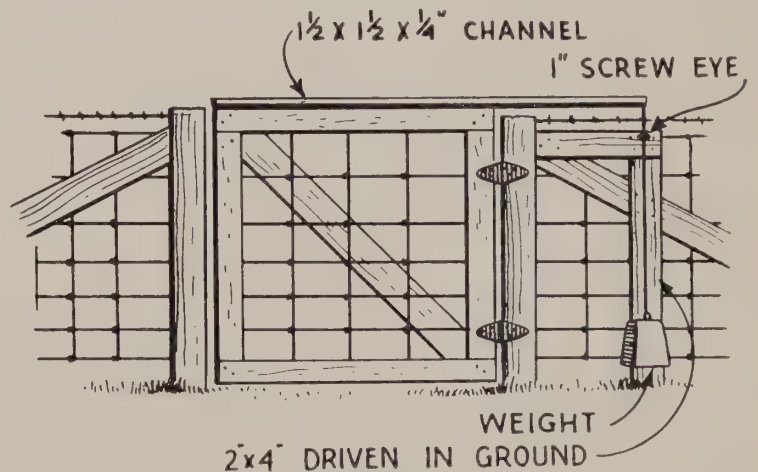
Fastening a Temporary Fence



Here is a very quick and effective method of fastening temporary fences to wood posts.

Merely drive two staples into each post for each strand of the fence, spacing them about one-half inch apart. Pass the strand between the staples and, holding the wire against the post, insert a cotter key or nail through both staples in front of the wire. To remove the fence, just remove all the pins or nails from the staples.

Self-Closing Garden or Poultry Gate



It's so easy to leave the garden or poultry yard gate unlatched when you are coming through with your hands full of eggs or vegetables. It's difficult to unlatch and open such gates, too, when you are thus encumbered.

Here is a double acting gate that will eliminate those conditions. A slight push will open it and it swings back into position when you have passed through.

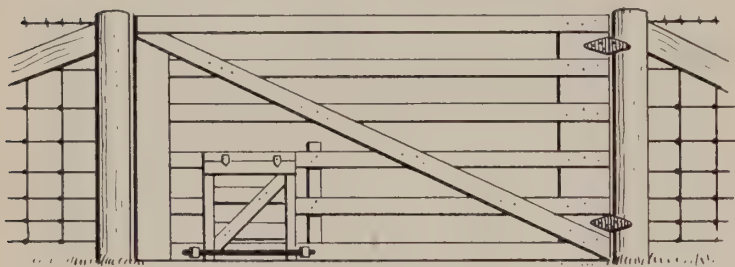
The closing arm may be made from $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{4}$ " angle iron, about 18 inches longer than the gate itself, fastened to the top of the gate with heavy wood screws. If a steel gate with pipe frame is used, the angle iron can be bolted to the top of the frame through holes drilled through the pipe. Double acting hinges should be used, permitting the gate to swing either way.

The rope (or a rust protected chain) is fastened to the end of the closing arm and passes

through a one-inch screw eye screwed into a piece of 2" x 4" which has been driven into the ground and securely fastened to the gate post brace. The weight on the opposite end of the rope or chain quickly returns the gate to the closed position after you have passed through. This weight may be an old iron casting, a paving brick or a block of concrete with a hook inserted for fastening the chain.

It may be necessary to bend the projecting end of the angle iron slightly to bring the rope fastening directly over the screw eye when the gate is closed.

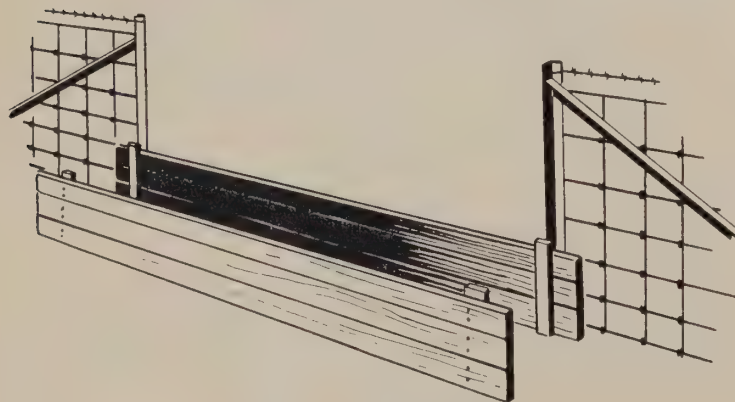
Double Purpose Gate



Here's a handy gate arrangement for separating hogs from cattle or allowing the hogs to enter the cattle pasture without opening the large gate and running the risk of the cattle getting out.

The small gate section is built into the large drive gate. Hinges are provided on the top or side and it may be held shut by a bar or a hasp which can also be used to hold it in the open position.

"Cattle Only" Gate

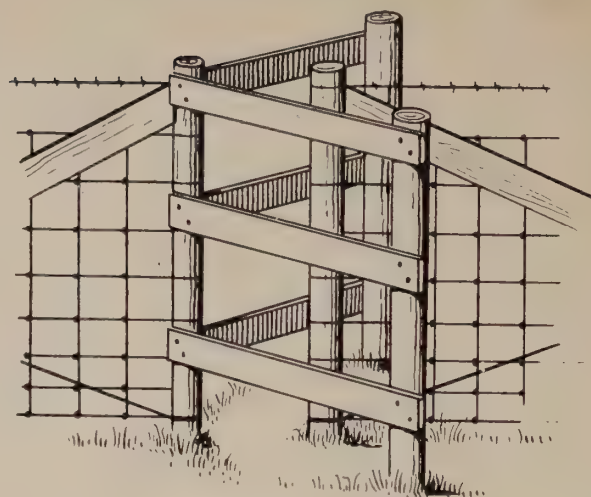


The illustration shows an arrangement which will permit cattle to pass from one field or pasture to another while successfully barring the way to hogs.

The "chute" is made of planks about eighteen or twenty inches high. One side of the chute is placed against the fence posts and the other is placed about twenty inches in front of it and held in place by 2" x 4" or heavier posts driven into the ground.

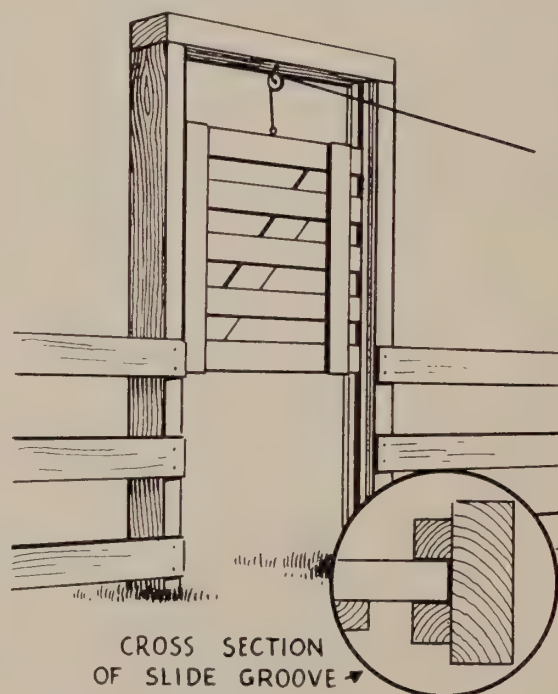
The cattle can step over the planks into the adjoining field but hogs are only able to walk between them. This is a simple yet very effective way of handling hogs and cattle in the same field.

Walk-Through Gate



The gate shown in the illustration is very handy as it permits a person to walk through from one field to another while barring the way to cattle and other large livestock.

Handy Hog Pen Gate



Hog raisers frequently find it difficult to separate the stock sows from pigs they wish to pen up for fattening. The usual plan is to have a man standing at the gate which leads from the pen to the enclosure where the fattening animals are to go, ready to open or close the gate as required. Often the hog which is to be moved from the drove starts toward the gate but becomes scared at the sight of the man and turns back.

The simple gate shown in the illustration eliminates this difficulty as it can be opened and closed readily from any point on the platform.

If a little grease is placed in the slide groove, the gate may be raised by a slight pull on the rope. When the tension on the rope is released, it quickly drops down, barring the way to passage of the animals. When in the closed position, it cannot be opened by pressure from either side.

Stock Guards

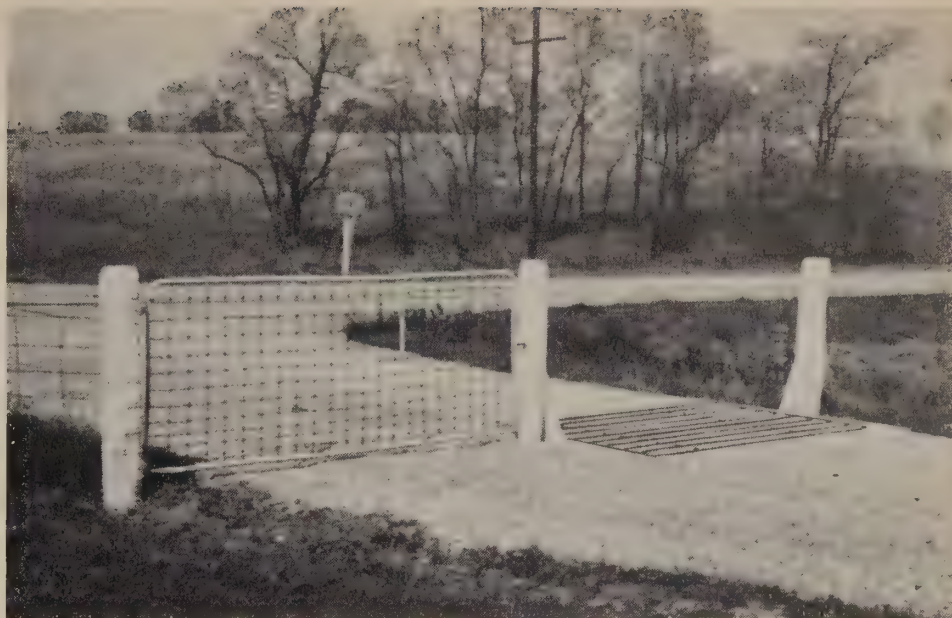
Opening and closing of gates at the end of frequently-used lanes is a source of annoyance and inconvenience when passing through with an automobile. Many farmers have solved this problem by providing a stock guard adjacent to the gate similar to that shown in the accompanying illustration.

The guard forms an effective barrier to the livestock and the gate, therefore, is provided for passage of teams and livestock when necessary.

The pit which forms part of the guard should be 12 to 18 inches deep below the grate or bars and 4 to 6 feet wide to control larger livestock. A concrete wall 6 to 8 inches thick should be used to line the pit. The wall will also serve as support for the grate. Steel pipe about 2 inches in diameter and spaced about 6 inches center to center will furnish adequate support for automobiles. If the gate is to be made strong enough to support loaded trucks, the use of small I-beams or discarded railroad rails is recommended. If the spacing of the pipe or rails is too wide, severe jolting will occur with possible damage to the supports from heavily loaded trucks.

It is desirable to make some provision for drainage of the pit and the grate should be removable. Kerosene or old lubricating oil may be used to control mosquitos or weeds if they prove to be a bother.

If sheep or goats are to be controlled by such a guard, V-shaped wings covered with woven wire and sloping from the ends of the pit to the fence or gate post should be provided. These animals will cross over if a smooth place 2" or more wide exists.



Kentucky Stock Guard Supplemented by a Gate.

Flood Gates

Fencing across small streams subject to overflow presents a problem requiring special treatment if upkeep of this section of the fence is to be kept at a minimum. Some type of flood gates such as that illustrated below offers the best solution. These gates will rise and fall with the water level, allowing debris carried by the flood stream to pass under and, at the same time, offering a barrier to livestock.

The gate is suspended from a steel pipe, rod or cable, depending upon the width of the stream, substantially anchored to a post on each bank. If the stream has steep irregular banks or is of appreciable width it will probably be desirable to construct the gate in sections, each of which will be free to move independently. The horizontal members should be kept at a minimum since they naturally will tend to collect driftwood and floating vegetation.

For control of hogs, the vertical members should be spaced fairly close whereas the spacing may be increased considerably if cattle or horses only are to be controlled.

The nature of the stream should be considered in determining whether to carry the main fence across the stream above the flood gate. If the stream is very wide or subject to extreme rise during flood stage it will probably be better to terminate the fence at each side. For such an arrangement the end posts should be set back from the bank of the stream a sufficient distance to obtain solid support for the posts. A short separate length of fence should be installed between the permanent end post and the flood gate.

Left: Flood Gate in Central Indiana.



Fencing on the Contour

For years agricultural experts and fence manufacturers have been stressing the desirability of avoiding or straightening crooked fence lines in the interest of greater efficiency and ease in handling crops in the fields. Good farm operators have profited by this advice. This is still good practice for the farm that lies on level ground. In fact as farm implement manufacturers have speeded up both tractors and the equipment they power, the saving in cost and ease of operation in fields bounded by straight sides takes on even greater importance.

With almost every rule however there is an exception. During the past few years national attention has been directed to saving the soil and farmers on rolling or hilly land have become conscious of the amount of soil which is moving off their fields by the process of erosion. Contour and strip farming supplemented in some cases with terracing have now been tried by enough farmers to take these erosion control measures out of the purely experimental class so they may be dealt with as new but practical methods of farming.

Farmers who have adopted these new methods report savings in tractor fuel and time, and less wear and tear on equipment than formerly experienced in farming up and down the hills. Since erosion is reduced, more of the water is absorbed by the soil, contributing to higher crop yields.

The change from square farming to round-the-hill farming is not being made without creating new problems—one of which relates to fencing. Herein lies the exception to the rule regarding straight fence lines.

With new crop areas laid out to follow the contour of the hills many long point rows are likely to be encountered if the farm has previously been fenced in the customary manner. Point rows adjacent to division fences between adjoining farms will probably have to remain point rows although in a few cases the owners of such farms have adopted contour boundaries. Something can and should be done, however, about the fences within the farm boundary which divide the various fields.

As with any problem regarding the layout or relocation of fences it is usually best to make the changes first on paper. Mistakes made on paper can be easily erased; not so with an actual fence after spending time and labor to make the change. Photographs of farms are now available at a nominal cost in many sections of the country as a result of aerial surveys made by the government. The locations of present boundary and division fences, lanes, streams, etc., can be traced from these photographs on tracing paper to provide a splendid work map. Where such photographs are not available, suitable maps may be made by actual land measurements.

Right:

Contour lane following the ridge top with contoured fields on each side. Straight sections of fence are used with well braced corners where the direction is changed to conform approximately to the contour.

Photograph by Courtesy of the Soil Conservation Service.



Left:

Contour cattle lane 90-rods long separating rotation hog pastures. Lanes which follow the contour are not subject to the formation of gulches like those which are built straight up and down the hill.

Photograph by Courtesy of the Soil Conservation Service.





This fence was used as a guide to plant corn on the contour. Two braced-post assemblies were used to change the direction of the fence. A three row cultivator is shown in operation with a terrace in the background.

Photograph by Courtesy of the Soil Conservation Service.

Starting with such a map, the location of new fences should be indicated by dotted lines with suitable indications for such portions of existing fences as must be removed or relocated.

Several principles should be observed in establishing new fences to fit this method of farming. First, a fence crossing a slope should follow along the contour. Such a fence will serve the important function of a guide line in plowing and planting the field in subsequent years after the first contour guide stakes have been removed. Second, fences may parallel a natural waterway. If this waterway is a ditch or a stream the fence may be placed on firm ground on one side or the other. Third, a fence may be placed on a ridge where it obviously will not interfere with the contour operations.

Of course it will not be possible to work out a perfect field arrangement on every farm but the above principles should be kept prominently in mind in determining the location for each fence. Usually it will be necessary to relocate lanes as well as division fences in this program to give livestock proper passage to newly created fields distant from the farmstead. By proper planning, one lane in some instances may be so located as to serve all or at least a majority of the distant fields. Utilizing a permanent pasture as a connecting link in the lane system may reduce the length of the lane fence it is necessary to construct. The location of the lanes as well as the gates opening to the various fields should be carefully laid out on the farm map as a part of the fence program.



A recently completed permanent contour fence. The strip of vegetation on the left will remain in pasture. The field at the right, laid out on the contour, will be in a strip crop program.

Photograph by Courtesy of the Soil Conservation Service.

Having determined the location for the new fences and the approximate size of the fields they will enclose by use of the farm map, the contour lines should be staked out on each field by the use of a farm level. This contour line will also mark the location for the fences.

Contour fence building will differ from straight line fencing in several ways. The line posts must not only serve to hold the fence in a vertical position and at a proper spacing above the ground, but also to resist the lateral thrust as the fence is stretched. To meet this added requirement the posts should be spaced closer together than in the case of straight line fencing. Instead of the usual spacing of one rod it may be necessary on relatively sharp curves to space the posts 10 to 14 feet apart depending on the height and weight of woven wire to be applied. Placing an occasional steel post in concrete or wood posts about six inches deeper than ordinary will lend more stability to the fence. More brace posts will also be needed. In general they should be placed at points where there is a marked change in direction of the curve of the fence to permit stretching the fence in relatively short sections. Although it is possible to stretch 40 rods or more of fence in a straight fence row at one time, 10 to 15 rods will probably be the maximum with contour fences. Never attempt to stretch around two curves swinging in different directions at the same time. In other words, stretch each section of an S curve separately.

Instead of building the fence exactly on the contour line some farmers prefer to follow this line only in general by constructing a series of straight line fences making a more severe change of direction at each brace post. While this practice may require more brace post construction, it will permit the use of line posts of customary lengths.

When wood posts are used on a contour line, the bearing side of the post should be placed



Building a Terrace in South Carolina.

against the firm soil. A rock or stone wedged between the bottom of the post and the other side of the hole will help to hold the post vertical. Above ground bracing of posts should preferably be placed directly in the line of the fence since braces extending out into the fields on either side make mowing of weeds difficult and also interfere with operation of other field machines. The use of steel braces with formed ends which may be bolted to the posts will prove much more satisfactory than the use of wood braces. It is very difficult to keep wood braces properly in place.

The use of good materials—good fence, barbed wire and posts—is, of course, essential to a good fence. Add good workmanship in erecting the fence and you have the key to years of satisfactory service and low maintenance cost.

For further information on the subject of soil conservation consult your county agricultural agent, farm advisor or state agricultural college.



A Southern Cotton Field Planted on the Contour.

LIVESTOCK SECTION

Identifying Stock For New Hands

Painting large numbers on the beams behind the stanchions and stalls in the barn, makes it much easier to give directions and instructions to new hired help who are not familiar with the names of the animals. A card with the names and corresponding numbers is then hung in a convenient place so that the names can be referred to until remembered.

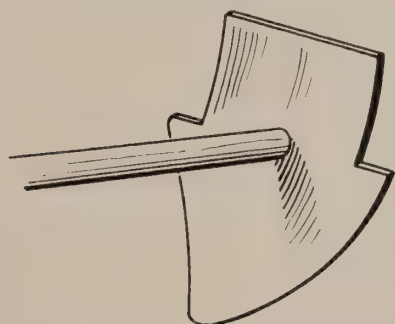
Loading Contrary Hogs

If you have trouble running hogs up a chute into a truck, try this plan. When they insist on reversing themselves at the foot of the chute, simply force a half-bushel basket over their heads. In their struggles to back out, the hogs will back all the way up the chute and into the truck.

Removing Water Tank Moss

Cleaning water tanks at regular intervals and scrubbing with lime or lye water is the most satisfactory method of keeping down the green moss. Rinse thoroughly before using. This moss grows only in sunlight. A tight-fitting cover will discourage its growth.

Cleaner For Hog Troughs



A good practice for any hog raiser is to provide clean troughs at all times.

A handy cleaning device may be made from a cultivator shovel by attaching a handle about 2 feet long. This tool is especially useful for the common V-shaped type of trough. On other troughs an old spade heated and shaped to the contour of the trough will serve the purpose.

Preventing Waste of Straw

To keep cattle and other livestock from spreading and wasting straw or hay in the stack, place ordinary woven wire fencing around the base of the stack.

Save Time Feeding Hogs

Allow the end of the hog trough to project about a foot outside the fence. This will not only save steps but also eliminate the possibility of the animals spilling the feed pail before it can be emptied into the trough.

Estimating Age of Horses By Teeth

The age of horses may be rather accurately estimated by an examination of the teeth. The time of eruption, the "cups" or depressions on the wearing surfaces, and the form and direction of the teeth are all indicative of age at different periods of life. In older horses it becomes more difficult to estimate the age; however, the shape of the wearing surface gradually changes from triangular to rounded, and the direction of the teeth becomes more slanting. The following table gives data from which age can be determined with a fair degree of accuracy.

Location of Teeth	Age at Eruption		"Cups" disappear from the wearing surfaces of permanent teeth of—	
	Temporary or colt teeth	Permanent or horse teeth	Lower jaw at—	Upper jaw at—
First pair of middle incisors or "nippers".	Birth to 4 weeks.	2½ to 3 years.	5½ to 6 years.	9 to 10 years.
Second pair of incisors (located at either side of the "nippers").	4 to 8 weeks.	3½ to 4 years.	6½ to 7 years.	10 to 11 years.
Third pair or corner incisors.	7 to 10 months.	4½ to 5 years.	7½ to 8 years.	11 to 12 years.

Estimating Age of Cattle

From a practical standpoint the age of cattle is usually determined by the horns, the length of the tail, and the general appearance of the animal. However, the time of eruption of the teeth is a rather accurate guide.

There are four pairs of temporary incisors in the lower jaw that usually appear during the first few weeks of life. They are replaced by an equal number of permanent incisors that erupt about as follows:

Teeth	Age of eruption
First or middle pair incisors	15 to 18 months
Second pair incisors	24 to 30 months
Third pair incisors	33 to 36 months
Fourth pair incisors	42 to 48 months

Estimating Age of Sheep

The time of eruption of the permanent incisors provides a rather accurate method of determining the age of sheep. There are 4 pairs of them, all in the lower jaw, and they may be expected to come in about as follows:

Teeth	Age of eruption
First or middle pair	12 months
Second pair	24 to 27 months
Third pair	33 to 37 months
Fourth pair	48 months

Common Ailments of Dairy Calves

Common Scours. The development of a case of indigestion scours usually can be traced to some act of carelessness or neglect on the part of the caretaker. The most frequent cause of scouring is overfeeding. Scours may also be due to feeding from dirty pails, insanitary surroundings, dirty milk, sour milk, or milk fed at uneven temperatures and in varying amounts.

Treatment consists of first reducing the feed by approximately one-half. One 6-gram dose of bismuth sub-nitrate will also help to check the profuse diarrhea. One level teaspoonful of bismuth sub-nitrate weighs about six grams. Bismuth sub-nitrate may conveniently be given by mixing about six grams with three or four ounces of milk and feeding from a small necked bottle. Care should be taken in getting the calves back on full feed, so that they will not suffer another attack. The original cause must also be corrected to prevent a recurrence.

White Scours. White scours is an infectious diarrhea affecting calves during the first few days after birth. Since the disease is infectious in nature, the affected calves should be isolated to avoid spreading the disease from one calf to another. On farms where white scours has been known to occur, it may be advisable to limit milk feeding to not more than four to six pounds daily for the first few weeks. Calves should be separated from the dam after the first feed of colostrum and starved for a 24-hour period. This is important! After the 24-hour period, begin feeding regular whole milk from the dam. In event of a severe outbreak, a competent veterinarian should be consulted and his directions followed.

Pneumonia. Pneumonia in calves is rather common, especially during the winter months. The symptoms are coughing, rapid and difficult breathing, high temperature of 105° to 106° F., rapid pulse, listlessness, and running at the nose. An experienced veterinarian should be called. Sick calves should be blanketed and placed in a stall that is free from drafts. In severe cases, a mustard plaster may be applied over the chest. Daily doses of 50 cubic centimeters of cod liver oil are also beneficial.

Ring Worm. The disease is caused by a parasite which burrows in circular areas under the skin. The affected areas should be washed with soap and water. After the areas are thoroughly dry, they should be painted with tincture of iodine.

Lice. Lice are usually more bothersome on young calves than on older animals. A mixture of three parts flowers of sulphur and one part hellebore is an excellent lice powder. The mixture should be dusted over the back and neck and rubbed into the hair with the hands. The treatment needs to be repeated in from 10 days to two weeks to kill the nits.

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Age At Which to Breed

Holstein and Ayrshire heifers should calve between 27 and 30 months of age.

Guernsey and Jersey heifers between 24 and 27 months of age.

Growth and development should be considered, as the under-developed heifer should be bred to calve later.

Gestation Table

Service Date	EXPECTED BIRTH DATE			
	Mare	Cow	Ewe	Sow
Jan. 1	Dec. 7	Oct. 11	May 31	Apr. 25
Jan. 11	Dec. 17	Oct. 21	June 10	May 5
Jan. 21	Dec. 27	Oct. 31	June 20	May 15
Jan. 31	Jan. 6	Nov. 10	June 30	May 25
Feb. 10	Jan. 16	Nov. 20	July 10	June 4
Feb. 20	Jan. 26	Nov. 30	July 20	June 14
Mar. 2	Feb. 5	Dec. 10	July 30	June 24
Mar. 12	Feb. 15	Dec. 20	Aug. 9	July 4
Mar. 22	Feb. 25	Dec. 30	Aug. 19	July 14
Apr. 1	Mar. 7	Jan. 9	Aug. 29	July 24
Apr. 11	Mar. 17	Jan. 19	Sept. 8	Aug. 3
Apr. 21	Mar. 27	Jan. 29	Sept. 18	Aug. 13
May 1	Apr. 6	Feb. 8	Sept. 28	Aug. 23
May 11	Apr. 16	Feb. 18	Oct. 8	Sept. 2
May 21	Apr. 26	Feb. 28	Oct. 18	Sept. 12
May 31	May 6	Mar. 10	Oct. 28	Sept. 22
June 10	May 16	Mar. 20	Nov. 7	Oct. 2
June 20	May 26	Mar. 30	Nov. 17	Oct. 12
June 30	June 5	Apr. 9	Nov. 27	Oct. 22
July 10	June 15	Apr. 19	Dec. 7	Nov. 1
July 20	June 25	Apr. 29	Dec. 17	Nov. 11
July 30	July 5	May 9	Dec. 27	Nov. 21
Aug. 9	July 15	May 19	Jan. 6	Dec. 1
Aug. 19	July 25	May 29	Jan. 16	Dec. 11
Aug. 29	Aug. 4	June 8	Jan. 26	Dec. 21
Sept. 8	Aug. 14	June 18	Feb. 5	Dec. 31
Sept. 18	Aug. 24	June 28	Feb. 15	Jan. 10
Sept. 28	Sept. 3	July 8	Feb. 25	Jan. 20
Oct. 8	Sept. 13	July 18	Mar. 7	Jan. 30
Oct. 18	Sept. 23	July 28	Mar. 17	Feb. 9
Oct. 28	Oct. 3	Aug. 7	Mar. 27	Feb. 19
Nov. 7	Oct. 13	Aug. 17	Apr. 6	Mar. 1
Nov. 17	Oct. 23	Aug. 27	Apr. 16	Mar. 11
Nov. 27	Nov. 2	Sept. 6	Apr. 26	Mar. 21
Dec. 7	Nov. 12	Sept. 16	May 6	Mar. 31
Dec. 17	Nov. 22	Sept. 26	May 16	Apr. 10
Dec. 27	Dec. 2	Oct. 6	May 26	Apr. 20

AVERAGE GESTATION PERIOD

	Weeks	or Days	Extremes (days)
Sow.....	16	112	109 to 120
Ewe.....	22	150	146 to 157
Cow.....	40½	283	240 to 311
Mare.....	48½	340	307 to 412

Precautions at Lambing Time

If all of the lambs are to be saved give strict attention to the following recommendations:

1. Have lambs born in clean quarters.
2. Apply tincture of iodine to the navel soon after birth.
3. Do not allow the lambs to become chilled.
4. See that the ewe has milk, that her udder is normal, her teats open and that the lamb gets milk.
5. Provide reasonable protection from severe weather until the lambs are a few weeks old.

Feeding Suggestions

Definitions of Feeding Terms

Concentrates. Feeds such as grains, cottonseed meal, and tankage which are rich and supply a large quantity of feed per unit weight.

Roughages. Feeds such as hay, straw, roots and silage which are coarse and bulky in nature.

Legumes. Plants such as clover, alfalfa, cowpeas, and soybeans which have nodules on their roots containing bacteria that can take nitrogen from the air. Legumes are generally richer in protein and minerals than other roughages.

Nutrients. Nourishing substances in feeds.

Protein. The only nutrient which can produce growth and make repairs in the animal's body. Lean meat, skim milk, wheat bran, cottonseed meal, and tankage are some of the feeds which contain relatively large quantities of protein.

Carbohydrates and Fats. Nutrients which produce fat, heat, and power to do work in the animal's body. Fat is about two and one-fourth times as valuable for these uses as carbohydrates. Feeds containing large quantities of starch and sugar are rich in carbohydrates, while large quantities of fat are contained in oily feeds. Corn is rich in both carbohydrates and fat.

Mineral Matter. Nutrients used principally to build the skeleton, hair, hoof, horn, and the like. Legume hays, bran, linseed meal, and skim milk have relatively large quantities of mineral matter.

Vitamins. Substances found in feeds in very small quantities which are necessary for growth, reproduction, and protection against diseases.

Crude Fiber. The coarse, woody part of plants and one of the carbohydrates much less digestible than the others.

Ration. The quantity of feed given an animal during one day.

Balanced Ration. A ration which contains the proportion of nutrients properly to nourish the animal to which it is fed.

All-Purpose Protein Supplement

For All Classes of Farm Animals

	Per Cent
Tankage	30
Soybean oil meal	30
Cottonseed meal	20
Linseed oil meal	15
Minerals	5
(Fine limestone 2, steamed bone meal 2, salt 1).	

Home-Made Mineral Mixtures

For Cattle and Sheep

A mixture of equal parts of loose salt and steamed feeding bone meal, fed so that cattle and sheep are allowed free access, generally answers the demands as far as mineral mixtures are concerned for these animals. This mixture is proving very popular with livestock men.

With breeding ewes, however, it would be well to add two ounces of potassium iodide to every 100 pounds of the above mixture during the gestation period. This is done as a preventive of goiter, which has caused severe losses in young lambs at lambing time.

Iodide in Rations

The use of potassium iodide in livestock rations during the winter season is recommended. It is especially important before lambing, farrowing, and foaling time as a preventive against losses. Strengths recommended by experts are:

Swine. Dissolve one ounce of potassium iodide in a quart of water and give one ounce of this solution as a daily dose for 10 brood sows.

Brood Mares in Foal. One ounce of above solution fed weekly on the grain.

Sheep and Beef Cattle. Two ounces of potassium iodide to each 100 pounds of salt or a mixture of bone meal and salt before the animals.

Weights and Measures of Common Feeds

In calculating rations it is usually necessary to use weights rather than measures. However, it is often easier to measure concentrates. The following table makes this possible:

Feed	Weight of 1 quart (approximate to 1/4 pound)	Approximate weight of 1 bushel
	Pounds	Pounds
Alfalfa feed	3/4	25
Barley	1 1/2	48
Beet pulp (dried)	1/2	19
Brewers' grains (dried)	1/2	19
Buckwheat	1 1/2	50
Buckwheat bran	1	29
Charcoal	1/2	20
Corn, husked, ear		70
Corn, cracked	1 1/2	50
Corn, shelled	1 3/4	56
Corn meal	1 1/2	50
Corn-and-cob meal	1 1/2	45
Cottonseed meal	1 1/2	48
Cowpeas	2	60
Distillers' grains (dried)	1/2	19
Fish meal	1	35
Gluten feed	1 1/4	42
Linseed meal (old process)	1	29
Linseed meal (new process)	1	35
Meat scrap	1 1/4	42
Molasses feed	3/4	26
Oats	1	32
Oats, ground	3/4	22
Oat middlings	1 1/2	48
Peanut meal	1	29
Rice bran	3/4	26
Rye	1 3/4	56
Soybeans	1 3/4	62
Tankage	1 1/4	40
Velvet beans, shelled	1 1/2	60
Wheat	2	60
Wheat bran	1/2	19
Wheat middlings, standard	3/4	26
Wheat screenings	1	32

Suggested Rations For Swine

A. Suckling Pigs, 5 to 40 lbs. (feed in creep):

1. Corn 80 lbs., tankage 20 lbs.
2. Corn 40 lbs., hominy 40 lbs., tankage 20 lbs.
3. Corn 75 lbs., middlings 10 lbs., tankage 15 lbs.
4. Corn 30 lbs., ground barley 30 lbs., ground oats (screened) 25 lbs., tankage 15 lbs.

B. Weanling Pigs, 30 to 100 lbs.:

1. Corn 80 to 85 lbs., tankage 15 to 20 lbs.
2. Corn 75 to 80 lbs., middlings 10 lbs., tankage 10 to 15 lbs.

C. Shoats, 100 to 175 lbs.

1. Corn 85 to 90 lbs., tankage 10 to 15 lbs.
2. Corn 75 to 80 lbs., middlings 10 to 15 lbs., tankage 10 lbs.
3. Corn 50 lbs., ground barley, wheat or rye 40 lbs., tankage 10 lbs.
4. Corn 60 lbs., ground oats 30 lbs., tankage 10 lbs.

D. Hogs, 175 to 250 lbs.:

1. Corn 92 to 96 lbs., tankage 4 to 8 lbs.
2. Corn 60 lbs., ground barley, wheat or rye 35 lbs., tankage 5 lbs.

For pigs weighing 75 pounds and up, well started on pasture, the tankage may be reduced by one-half.

Skim milk or buttermilk may replace part or all of the tankage in above mixture; 2 quarts per pig on pasture to 4 quarts per pig in the dry lot should be available to replace all the tankage. With lesser amounts, the tankage in the mixture may be reduced proportionately.

E. Brood Sows

1. Corn 60 lbs., whole or ground oats 35 lbs., tankage 5 lbs.
2. Corn 60 lbs., wheat middlings 35 lbs., tankage 5 lbs.
3. (For sows nursing pigs) corn 60 lbs., oats 30 lbs., tankage 10 lbs.
Access to legume hay in rack or pasture.
4. (For sows nursing pigs) corn 50 lbs., barley, rye or damaged wheat 40 lbs., tankage 10 lbs.
Legume hay or pasture.

Two gallons of skim milk per sow per day may be used in place of the tankage.

Trinity or Trio Mixture

To be self-fed with corn or other grains.

(Protein Supplement for Hogs)

Tankage	2 parts
Vegetable protein	2 parts
(Cottonseed, linseed or soybean oil meal)	
Alfalfa	1 part

Mineral Mixture

Finely ground limestone	2 parts
Steamed bone meal	2 parts
Salt	1 part

Suggested Rations For Sheep

A. Lambs (6 Weeks Until Weaning)

Oats	5 parts
Corn	3 parts
Bran	1 part
Linseed cake or cottonseed cake	1 part

B. Young Lambs

Corn (coarsely ground or cracked)	2 parts
Oats (rolled or crushed)	2 parts
Bran	1 part
Pea size oil cake	1 part

C. Fattening Lambs

1. Shelled corn, alfalfa, red clover or soybean hay.
2. Barley, alfalfa, red clover or soybean hay.
3. Shelled corn or barley 9 parts; cottonseed cake, linseed cake or soybean oil meal 1 part; corn silage, legume hay.
4. Shelled corn or barley 6 parts; whole oats 4 parts; cottonseed cake, linseed cake or soybean meal 1 part; corn silage and legume hay.

The feeding lambs should be started on grain gradually, around 3 weeks being taken to get the lamb up to one pound of grain daily. In fact, the daily allowance of grain should not average over one pound per head daily for the first 30 days. Approximately $1\frac{1}{4}$ pounds of grain per head daily should be fed the second 30 days and $1\frac{1}{2}$ pounds of grain per head daily the third 30 days or until the lambs are finished. In addition to the above grain allowance, the lambs should have all of the roughages as indicated above that they will consume.

D. Self-Feeding Lambs

Many feeders prefer to handle their lambs on a self-feeder. Excellent results have been obtained with the following ration in a self-feeder:

First 10 days, 2 parts ground or chopped alfalfa to 1 part shelled corn by weight.

Second ten days, equal parts of ground or chopped alfalfa hay by weight with shelled corn.

Thereafter, 2 parts shelled corn to 1 part of ground or chopped alfalfa hay with a limited allowance of long alfalfa hay in addition in the feed rack.

Another method of utilizing the self-feeder found satisfactory is to get the lambs on a full feed of corn by hand-feeding it for three weeks and then put them on a self-feeder of straight corn.

E. Ewes

1. Corn, 5 parts
Oats, 3 parts
Bran, 2 parts
Linseed cake, 1 part

$\frac{1}{2}$ pound daily

Corn silage	2 lbs.
Legume hay	$1\frac{1}{2}$ to 2 lbs.

2. $3\frac{1}{2}$ pounds of legume hay per head daily with $\frac{1}{2}$ pound of grain per head daily last 30 days preceding lambing. 1 to $1\frac{1}{2}$ pounds of grain per head daily following lambing.

3. $1\frac{1}{2}$ to 2 pounds of legume hay daily. Oat straw, bean pods or corn stalks at will. Grain as in ration 2.

During the winter season, breeding ewes should have access to a mineral mixture consisting of 25 pounds of salt, 25 pounds of steamed feeding bone meal and 1 ounce of potassium iodide.

Winter Grain Mixtures for Dairy Cows

Grain Mixtures For High Protein Roughages

(Such as alfalfa, soybean or clover hay, with or without silage.)

Total protein 13-15% — Digestible protein 10-12%

	Mix. 1 (lbs.)	Mix. 2 (lbs.)	Mix. 3 (lbs.)	Mix. 4 (lbs.)	Mix. 5 (lbs.)
Corn and cobmeal	400	400	200	—	500
Ground barley	—	—	200	400	—
Ground oats	400	200	400	400	300
Wheat bran	—	200	—	—	—
Cracked soybeans	100	100	100	100	100

Grain Mixtures For Mixed Hay

(Such as timothy and clover or a mixture of other high protein and low protein roughages, with or without silage.)

Total protein 17-20% — Digestible protein 14-16%

	Mix. 1 (lbs.)	Mix. 2 (lbs.)	Mix. 3 (lbs.)	Mix. 4 (lbs.)	Mix. 5 (lbs.)
Corn and cobmeal	400	200	200	—	500
Ground barley	—	200	200	400	—
Ground oats	400	200	400	200	300
Wheat bran	—	200	—	200	—
Cracked soybeans	300	250	250	250	300

Grain Mixtures For Low Protein Roughages

(Such as timothy, sudan grass, oat hay, corn fodder, millet, etc., with or without silage.)

Total protein 20-21% — Digestible protein 16-18%

	Mix. 1 (lbs.)	Mix. 2 (lbs.)	Mix. 3 (lbs.)	Mix. 4 (lbs.)	Mix. 5 (lbs.)
Corn and cobmeal	400	400	200	—	500
Ground barley	—	—	200	400	—
Ground oats	400	200	—	200	300
Wheat bran	—	200	400	200	—
Cracked soybeans	400	400	400	400	400

Substitutions

1. Corn and cobmeal can be replaced by an equal weight of ground corn or barley. Wheat can also be substituted for corn but should not make up more than one-third of the grain mixture.

2. Ground oats can be replaced by an equal weight of bran but due to the lower total digestible nutrients in bran it would be desirable to increase the percentage of corn in the grain ration.

3. Cracked soybeans can be replaced by an equal weight of linseed oil meal, soybean oil meal, cottonseed meal or gluten meal. Gluten meal differs from gluten feed in that it does not contain the corn bran. Gluten meal is about 12 to 15 percent higher in protein than gluten feed. About two-thirds of a pound of tankage will replace the protein in one pound of soybeans.

Select the grain mixture which fits the roughage; also consider the feeds on hand and the costs per ton of the mixtures.

From "Feeding Dairy Cows," Iowa Bulletin No. 177 (Revised)

Suggested Rations For Beef Cattle

Average daily rations for fattening calves, starting at 400 lbs. weight and gaining 400 to 500 lbs. in 180 to 240 days.

No. 1

Corn or barley or part oats	7.5 lbs.
Cottonseed or soybean or linseed oil meal	1.3 lbs.
Corn silage	18.0 lbs.
Legume or mixed hay	3.5 lbs.

No. 2

Corn or barley or part oats	11.0 lbs.
Cottonseed or soybean or linseed oil meal	1.3 lbs.
Corn silage	8.0 lbs.
Legume or mixed hay	3.0 lbs.

No. 3

Corn or barley or part oats	12.0 lbs.
Cottonseed or soybean or linseed oil meal	1.1 lbs.
Legume or mixed hay or some corn stover	6.0 lbs.

Equal parts special steamed feeding bone meal and granulated salt should be available at all times, not in the feed.

Molasses may replace grain in the above rations. More than 2 lbs. per day of beet molasses may be too laxative.

Many other feeds may be substituted for feeds of similar composition in these rations.

The longer the feeding period the more roughage can be used in the beginning to conserve grain for the finish, however, gains of less than 40 pounds per month in the beginning or 60 pounds per month toward the finish are likely to be costly. The higher the grade of cattle, the better ration and the longer the feeding period advisable.

Yearling steers may be fed similar rations to those above with increased amounts according to weights of the cattle. Coarser feeds, such as shock corn, corn stover, non-legume hay, etc., may be used more readily by these older cattle.

Simple Rules For The Production of Quality Cream

1. See that the flanks and udder of the cow are clean and wipe the udder with a damp cloth before milking.
2. Use a small top milk pail.
3. Separate the milk while still warm, using a separator set to deliver cream containing approximately 35 per cent butter fat in the winter and 40 per cent in the summer.
4. Protect the cream from contamination such as dust, dirt, ants, mice, etc.
5. Immediately after using the separator and other utensils, clean thoroughly with a good dairy cleanser and place in a dry sunny place. Just before using equipment rinse with a chlorine solution (50 p.p.m.).
6. A cream cooling tank protected from the sun will help materially in holding the cream at a cool temperature.
7. Do not mix warm cream with cold cream. When one lot of cold cream is added to another lot stir until the mixture is uniform.
8. Market the cream while fresh, preferably before it sours. Do not hold cream over four days, but deliver as often as economic conditions will permit.
9. Cover the cream can with a wet sack during warm weather en route to market.

(From Mississippi Agricultural Experiment Station Information Sheet No. 150.)

POULTRY SECTION

Suggestions For Culling The Flock

Cull:

1. Cripples and hens with broken down abdomens.
2. Poor layers and old hens.
3. Sick and inactive hens.
4. All "crow-heads" with long, slim heads and beaks.
5. Large, coarse-headed hens with sunken eyes.
6. Late hatched, immature pullets, and those undersized from earlier hatches.
7. All hens that moult before August 1st.
8. All hens with solid fat abdomens.
9. The hens that insist on setting.
10. All cockerels not needed in the flock for future breeding purposes.

Keep:

1. Strong, healthy hens with short, neat heads and strong beaks.
2. Hens with long deep bodies.
3. Hens with bright eyes and active appearance.
4. Hens with dirty, dusty, worn feathers, but looking healthy.
5. Rapid and late moulters.
6. Vigorous hens with bleached beaks and shanks.
7. Hens with well spread pelvic bones.
8. Early hatched, well grown pullets.
9. Hens conforming to their breed characteristics.
10. Large, strong, active, well matured cockerels of good type and ancestry for breeding.

Brooding Precautions

Four brooding essentials to help assure a successful season are:

1. Brood chicks on ground where chickens have not ranged for several years, and keep the growing pullets on a clean range until they are five months old.

2. Disinfect the brooder house thoroughly before putting the chicks in it, and clean the house at least once a week afterwards.

3. Keep a pan of creolin or some other disinfectant at the entrance to the chick yard for disinfecting the soles of anyone's shoes before entering.

4. Scrub and disinfect the permanent laying house before putting pullets in it, and plow and reseed the range about the laying house before allowing the pullets on it.

5. As the chicks increase in size, the litter in the brooder house will need changing more frequently. Good, clean, dry litter helps in preventing outbreaks of disease.

Suggestions For Marketing Eggs

Keep strong, healthy, vigorous stock and care for it properly.

Provide plenty of clean nests for the laying hens.

Gather eggs twice a day.

Keep the eggs in a cool, fairly dry place.

Keep out the cracked, dirty, small, and very large eggs for home use.

Never wash eggs unless they are to be used immediately by local trade.

Market eggs frequently, at least once a week and preferably twice.

Know the preferences of your market and strive to meet them.

Grade your eggs for uniformity in size, shape, and color.

Know the shipping requirements of express or railroad companies when you use their services.

Use only sound, strong standard packages and pack the eggs properly.

Remember quality is essential for best prices.

If you are selling through a satisfactory agency with which you have established a reputation for high quality, be very sure that you have secured a better outlet before you make a change.

Temperature Chart For Poultrymen

Still air incubator, 101° to 103° F.

Forced draft incubator, 99° to 100° F.

Hover, day old chicks, 95° to 100° F.

Hover, 1 to 2 weeks old chicks, 90° F.

Hover, 2 to 3 weeks old chicks, 85° F.

Hover, 3 to 4 weeks old chicks, 80° F.

Room housing incubator, 70° F.

Fertile eggs start incubation at 69° F.

Eggs for hatching, keep between 50° and 60° F.

Eggs at farm, store, or home, keep at 40° to 55° F.

Eggs deteriorate very rapidly between 80° and 100° F.

Cold storage eggs held at 29° to 30° F.

Eggs freeze at 28° F.

Keep a reliable thermometer for your incubator, brooder, and egg storage room.

(Adapted from Bul. 9, Connecticut Department of Agriculture.)

Suggested Rations for Laying Hens

	Pounds
Ground Yellow Corn	46.5
Middlings	20
Ground Oats	10
Bran	5
Alfalfa Leaf Meal	5
Meat Scraps	8
Dried Milk	4
Cod Liver Oil	1
Salt	0.5

HOMEMAKERS' SECTION

Removing Stains

Here are some effective methods of removing more common stains from clothing, hats, etc.

Grass Stain: Use hot water and soap and remove the stain by thorough rubbing. Or, apply grain or wood alcohol by sponging. This method is good for use on fabrics which might be injured by laundering.

Grease Stain: Scrape or wipe off as much of the grease as possible, then launder with a soap containing naphtha or kerosene. Carbon-tetrachloride, gasoline or naphtha, may be used. Carbon-tetrachloride is the safest as it is not inflammable. All others should be used in a cool shady place out of doors or before an open window away from all flames in the house. Place a pad of clean cloth or white blotter beneath the stain and change it as soon as it becomes soiled. Sponge the stain with a clean cloth, moistened with the solvent. To prevent the solvent and grease from spreading, it is best to use small amounts of the solvent at a time and work from the outside of the spot toward the center. After sponging, rub with a clean cloth until the spot is thoroughly dry.

Ice Cream Stain: Use ordinary laundering methods or sponge with luke-warm water and then use the solvents mentioned for grease.

Ink Stain: Soap and water will remove some types of school inks when rubbed thoroughly. If this does not prove satisfactory soak the stains in milk, a day or two if necessary. These methods are safe for use on all washable fabrics. If they fail you might try moistening the stain with lemon juice and expose it to the sun.

Fruit and Wine Stains: Quickly cover the spot with salt if fruit juice or wine is spilled on the table cloth. The salt lessens the stain and boiling water poured through the stains will usually remove them entirely. If the boiling water fails, try a weak solution of oxalic acid.

Coffee and Tea Stains: Pour boiling water through the stains until they disappear.

Iron Rust Stains: Cover rust spots with salt wet with lemon juice and lay out in the sun.

Other suggested stain removers for rust spots are:

Salts of lemon and sunshine as described above.

Ripe tomato may remove the stains.

Soaking in milk may also prove effective.

If the material is white linen or cotton, try chlorinated soda.

Kerosene Spots: Spots left by kerosene spilled on books, rugs or furniture will sometimes disappear if the article is left in the bright sunlight all day. If this fails, hold spotted article as close to a hot fire as you can comfortably hold your hand.

Paint Stains: Turpentine will remove paint spots from fabrics, glass or iron.

Blood Stains: Wash with clear, cold water. If this fails, wet with kerosene and wash in warm suds.

Mildew: Here are several suggestions for removing mildew:

Try lemon, salt and sun as suggested for iron rust.

Use diluted oxalic acid.

Rub the stains with molasses and then thoroughly wash the fabric.

If the material is white, try boiling it in butter-milk.

Removing Stains From Hands

Use vinegar, lemon juice, pumice, ripe tomatoes or dishwater to remove stains from the hands.

Removing Stains In Sink

Save the rind after squeezing a lemon and rub the kitchen sink out thoroughly with it. You will be surprised how it removes the stains.

Restoring Color to Fabrics

Color taken out by an acid can usually be restored with an alkali. Color taken out by an alkali can generally be restored by an acid.

Scouring Cutlery and Pans

To scour knives or other cutlery use a cork dipped in scouring powder. This method can also be used for scouring pans.

Fighting Household Pests

Ants: Sprinkle powdered borax on shelves and along baseboards and door sills to keep ants out.

Ants will not cross a broad, thick chalk line.

Wash shelves and cupboards with a strong alum solution (one pound of alum to two quarts of water) as a protection against insects of various kinds.

Moths: Moths do not like gum camphor, tar camphor, turpentine, pepper and extreme heat or cold.

Careful sweeping and dusting and frequent airing of clothing and hangings are natural preventatives of moths.

Water Bugs and Cockroaches: Most of the well-known powders and salts are effective in getting rid of these insects. Much of their effectiveness, however, is lost if the places where the pests congregate are not kept clean and dry.

Weights and Measures

Lard—2 cups make 1 pound
Butter—2 cups make 1 pound
Flour (Pastry or Bread)—4 cups make 1 pound
Flour (Whole Wheat)—3 $\frac{7}{8}$ cups make 1 pound
Flour (Graham)—4 $\frac{1}{2}$ cups make 1 pound
Flour (Rye)—4 $\frac{1}{8}$ cups make 1 pound
Corn Meal—2 $\frac{2}{3}$ cups make 1 pound
Rolled Oats—4 $\frac{3}{4}$ cups make 1 pound
Oatmeal—2 $\frac{2}{3}$ cups make 1 pound
Coffee—4 $\frac{1}{3}$ cups make 1 pound
Sugar (Granulated)—2 cups make 1 pound
Sugar (Powdered)—2 $\frac{2}{3}$ cups make 1 pound
Sugar (Confectioner's)—3 $\frac{1}{2}$ cups make 1 pound
Sugar (Brown)—2 $\frac{2}{3}$ cups make 1 pound
Meat (Chopped)—2 cups make 1 pound
Rice—1 $\frac{7}{8}$ cups make 1 pound
Raisins (Packed)—2 cups make 1 pound
Currants—2 $\frac{1}{4}$ cups make 1 pound
Bread Crumbs (Stale)—2 cups make 1 pound
Eggs (large)—9 make 1 pound

Butter—2 tablespoonfuls make 1 ounce
Flour—4 tablespoonfuls make 1 ounce
Baking Powder—6 tablespoonfuls make 1 ounce
Salt—1 tablespoonful makes 1 ounce

3 teaspoonfuls make 1 tablespoonful
16 tablespoonfuls dry ingredients make 1 cup
4 teaspoonfuls (liquid) make 1 tablespoonful
4 tablespoonfuls make 1 wineglass (or $\frac{1}{2}$ gill)
2 wineglasses make 1 gill
2 gills make 1 coffee cupful, or 16 tablespoonfuls
2 coffee cupfuls make 1 pint
2 pints make 1 quart
4 quarts make 1 gallon
2 tablespoonfuls (liquid) make 1 ounce
16 ounces make 1 pound—or 1 pint of liquid

1 pint finely chopped meat, packed solidly, makes 1 pound

4 coffee cupfuls sifted flour make 1 pound

1 quart unsifted flour makes 1 pound

1 pint sugar (white granulated) makes 1 pound

1 tablespoonful soft butter, well rounded, makes 1 ounce

An ordinary tumblerful equals 1 coffee cupful or $\frac{1}{2}$ pint

About 25 drops thin liquid makes 1 common teaspoonful

Using Staircases While Painting Them

A staircase coated with fresh paint is out of use unless a narrow track is left unpainted at one side or in the center, to be covered later when the rest of the paint is dry. But when a surface has been coated piecemeal in this fashion, it has an uneven look. A better method is to paint every other step, using the unpainted ones for ascending the staircase, and coating them later when the painted ones are dry. As each step is painted also paint the riser belonging to the next step. In this way the fresh paint will not be injured if a riser is accidentally kicked in using the stairway.

Protecting Bulbs From Moles

When setting out bulbs, such as gladiolus, in localities where moles are numerous, it is a good idea to place a tin can with the top and bottom cut out around each of the bulbs. This simple plan prevents moles from bothering them.

To Promote Plant Blooming

Three inches of dried and pulverized eggshells placed in an eight quart pail and covered with water is excellent for watering indoor house plants and window boxes. Blooms are more frequent, larger and brighter in color; leaves of geraniums are almost double in size. Eggshells are good for about 3 weeks.

Dipping Transplants

Newly set plants such as cabbage, tomatoes and flowers can be protected from most insect and pest attacks by dipping before transplanting in 4-6-100 bordeaux solution mixed with lead arsenate. Each plant should receive a complete dipping. Dipping will not control cutworm.

The following steps are suggested to make 100 gallons of dipping solution: 1. Dissolve 4 pounds of copper sulphate in 8 to 10 gallons of water; 2. Dissolve 6 pounds hydrated lime in 3 to 5 gallons water; 3. Add copper sulphate solution to 50 or 60 gallons of water and stir solution while pouring in the hydrated lime solution; 4. Mix 3 pounds lead arsenate in one to two gallons of water and add to other solution; 5. Dilute to 100 gallons.

To make 3 gallons of solution: 1. Dissolve 2 ounces of copper sulphate in one gallon of water; 2. Dissolve 3 ounces of hydrated lime in one gallon of water; 3. Put 1 $\frac{1}{2}$ ounces arsenate of lead in one gallon of water; 4. Pour the first 2 together and then stir while adding the lead arsenate solution.

Bordeaux Mixture

Bordeaux is made from copper sulphate (blue stone, blue vitrol), lime, and water. Whenever bordeaux is recommended, a formula is given such as 4-6-100. The first figure always indicates the amount of copper sulphate in pounds, the second figure the amount of hydrated lime in pounds, and the third figure the amount of water in gallons. A 4-6-100 bordeaux will require: 4 pounds copper sulphate, 6 pounds hydrated lime, 100 gallons water. The foregoing formula is an example only and should not be considered as a recommendation for any particular uses.

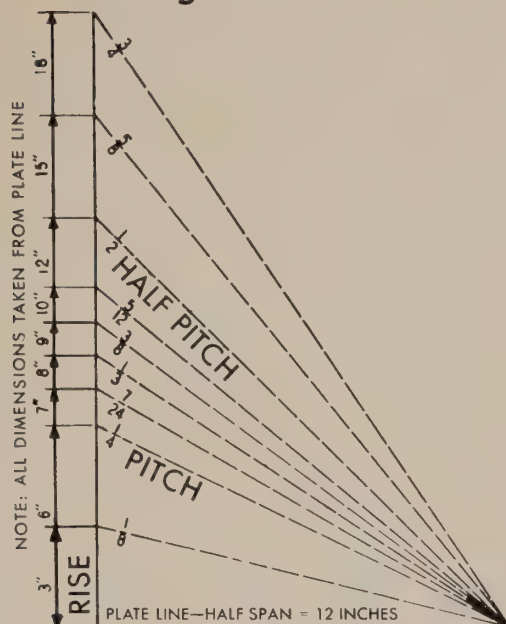
Copper sulphate may be obtained in several grades as to size of particles. For convenience in preparation, the rather fine, granular and pulverized grades are desirable.

Lime is available in two forms: "quick" or "lump lime" and hydrated lime. If "quick" lime is used, reduce the amount to two-thirds that specified for hydrated lime in the formula. Many grades of lime are undesirable for spraying purposes.

FARM BUILDING SECTION

For complete information on steel roofing and siding, refer to the 28-page book, "How to Select and Apply Steel Roofing on Farm Buildings", published by Republic Steel Corporation.

To Figure Roof Pitch



The pitch of roofs having straight slopes, such as gable roofs, should be determined by dividing the rise by the span, the span being the total distance between the outer edges of the plates on the side walls. In other words, divide the rise, per 12" of horizontal distance by 24. A full pitch gable roof is one with the rise equal to the span. A half pitch gable roof is one with the rise equal to half the span. Example:—figure the pitch of a gable roof having a rise of 6" to a half span of 12". Thus 6" (the rise) divided by 24" (the span) equals $6/24$, or $1/4$ pitch. The height of the ridge will be $1/4$ of the span of the building.

On a shed roof building the distance between the outer edges of the plates on the side walls will obviously be a half span for the purpose of figuring pitch.

Maintenance and Painting of Steel Roofing

All buildings require care regardless of what materials they are constructed. This applies, likewise, to sheet metal. Roofing receives more punishment than any other material on the outside of a building and for this reason it should receive periodical inspection and necessary attention.

Steel itself is a "strength metal," and, if properly applied and protected, as a roofing material it will last almost indefinitely and be an effective barrier against fire and storm.

All steel roofing, whether galvanized or not, should be painted. The galvanized coating will resist corrosion for varying lengths of time depending upon climatic conditions. In dry climates a galvanized roof might not need painting for many years. In other climates, particularly where the air is moist or full of smoke and corrosive

gases, it might be advisable to paint it after it has "weathered" for about six months. This assures better adherence of the paint.

Those who choose to wait until painting is necessary should not delay painting after the first signs of rust are visible.

A roof should be thoroughly clean before painting. All spots covered with loose rust should be brushed off with a wire brush. Loose nails should be removed and replaced with new ones, driven at an angle away from the old nail hole to assure good holding power.

Roofs should never be painted unless absolutely dry. It is very poor practice to try to paint just after a rain or when there is dew on the roof. Furthermore, if it seems that a storm is approaching, painting should be discontinued so the paint may set.

There are a number of good types of paint on the market which are suitable for use on galvanized steel sheets. With lead paints a rust-inhibiting or primer coat should first be applied for best results. Aluminum paint, used extensively in some parts of the country, also requires a primer.

Metallic zinc paint is being used increasingly on farms and has given excellent results. Its performance has been especially good even where the galvanizing has disappeared. The commercial formula best suited for application to galvanized sheets exposed to the weather calls for 80% zinc dust and 20% zinc oxide mixed with a suitable vehicle such as linseed or soy bean oil. This type of paint is furnished ready-mixed by a number of leading paint manufacturers.

Metallic zinc and paint spreads easily, a gallon covering about 800 square feet. It has good hiding properties and forms a tough, adherent coating. This paint is most commonly used in its natural color—a battleship gray—although some producers now furnish the paint in other colors.

Roofing Nails

All nails for use on roofing sheets should be galvanized. The necessity of sealing nail holes in metal roofing against the passage of moisture should never be disregarded. It is important, therefore, that nails with lead heads or an equivalent feature be used. Tests have proved the superiority in holding power of the drive screw type of nail. Other things being equal, the holding power of a nail is proportional to the area of its surface in contact with wood. For this reason two-inch nailing strips are recommended to obtain best anchorage. It is generally safe to figure on about one pound of nails for each square (100 square feet) of roofing.

Estimating Table for Steel Roofing Products

To find the number of sheets in a given number of squares, multiply the number of squares (100 square feet) by the number set opposite the length of sheets required, in the column showing style of roofing or siding to be used. The result will be the number of sheets required, without allowance for end or side laps.

Length of Sheet	1½-2-2½ & 3" Corrugated 26" Wide		2½" Corrugated 27½" Wide		All Forms of V-Crimp, Republic Triple Drain, Weatherboard Siding All 24" Wide	
	No. of Sq. Ft. Per Sheet	No. of Sheets Per Square	No. of Sq. Ft. Per Sheet	No. of Sheets Per Square	No. of Sq. Ft. Per Sheet	No. of Sheets Per Square
5 Ft.	10.833	9.231	11.46	8.73	10.00	10.000
6 Ft.	13.000	7.692	13.75	7.27	12.00	8.333
7 Ft.	15.167	6.593	16.04	6.23	14.00	7.143
8 Ft.	17.333	5.769	18.33	5.46	16.00	6.250
9 Ft.	19.500	5.128	20.63	4.85	18.00	5.556
10 Ft.	21.667	4.615	22.92	4.36	20.00	5.000
11 Ft.	23.833	4.195	25.21	3.962	22.00	4.545
12 Ft.	26.000	3.846	27.50	3.64	24.00	4.167

Barn Unit Dimensions

Consult local dairy ordinances before constructing the dairy unit. The dimensions given below will serve as a guide, however, in making preliminary plans.

FOR DAIRY CATTLE

Mangers. The mangers should be from 20 to 30 inches wide. The front curb should be 6 to 20 inches high and the rear curb 6 to 8 inches high.

Standard Dairy Stalls

Breeds	Width	Length of Stall*		
		Small	Medium	Large
Holstein	3'-6" to 4'-0"	4'-10"	5'- 2"	5'- 8"
Shorthorn	3'-6" to 4'-0"	4'- 8"	5'- 0"	5'- 6"
Brown Swiss	3'-6" to 4'-0"	4'- 8"	5'- 0"	5'- 6"
Ayrshire	3'-6" to 3'-8"	4'- 6"	5'- 0"	5'- 6"
Guernsey	3'-4" to 3'-6"	4'- 6"	4'-10"	5'- 4"
Jersey	3'-4" to 3'-6"	4'- 4"	4'- 8"	5'- 0"
Heifers	2'-9" to 3'-2"	3'- 8"	5'-10"	4'- 2"

* Stall length from center of curb to edge of gutter.

For adjustment in stall length to meet the requirements of cows of different sizes, either adjust the stanchion forward or backward as may be required or taper the stall platform, making it a few inches wider at one end than at the other. With the latter method, shorter cows can be assigned to stalls at the short end of the platform.

Gutters. Gutters should be 16 inches wide. Next to the platform, the depth should be 8 inches and next to the litter alley, 5 inches. A slope of one inch in 10 feet of run should be provided for drainage but the runs should not be more than

25 feet in length to avoid too great gutter depth. One drain can serve two runs of that length, or 50 feet, by having each run slope to the center.

Litter Alleys. When the cows face outward, the litter alley should be wide enough for a driveway, or 8 to 9 feet. The center of the alley should be one inch higher than the sides to provide drainage. For the face-in arrangement, the litter alleys should be 4½ to 5 feet wide.

Feed Alleys. If feed trucks are to be used, provision for their width should be made in planning the width of the alleys. They should be at least 4 feet wide, however.

Maternity Pens. Provide at least 100 square feet of floor area for each maternity pen. Maternity pens should not be less than 8 feet wide.

Calf Pens. A minimum of 16 to 20 square feet of floor space should be provided for each calf. Calves over six months of age will require 25 to 35 square feet of floor space. Space stanchions 20 to 24 inches apart.

Bull Pens. Bull pens are usually located in a corner of the barn to conserve space and to isolate the bull as much as possible. Provide the same amount of floor space as for maternity pens and arrange for a door opening directly into the exercise lot.

FOR HORSES

Box Stalls—Box stalls should be 10 feet wide and 12 feet long.

Standard Horse Stalls are 5 feet wide and 9 to 10 feet long, including 2 feet for the manger.

Feed alleys should be 3 to 4 feet wide and a space 6 feet wide should be provided for the rear alley.

FOR BEEF CATTLE

Make available 40 to 60 square feet of floor area and 30 inch manger or feed rack space for each animal not confined to a pen.

FOR SHEEP

A floor space of 12 to 16 square feet should be available for each head of sheep.

FOR HOGS

Farrowing pens should be approximately 8 feet by 8 feet in dimensions or from 50 to 70 square feet in area.

Floor Space Required for Poultry

	Sq. ft. per bird
Heavy or general purpose breeds	4
Light breeds	3
Baby chicks	1/3

In mild climates when birds are kept in colony houses and have access to free range the space required may be reduced to 3 sq. ft. for general purpose breeds and 2½ sq. ft. for Leghorns.

FARM SAFETY SECTION

Farm Fire Prevention

The old adage, "An ounce of prevention is worth a pound of cure", has a modern significance when applied to fires on farms. Farm fires seldom make the newspaper headlines like conflagrations in our cities, although the total loss resulting from them amounts to about 30 percent of the 100 million dollar annual fire loss of the nation.

With many of the fire-fighting facilities found in cities lacking on farms located distant from town, fighting fires before they start usually offers the best means of farm fire protection.

Principal Causes of Farm Fires

Although fires may originate in a great many different ways, an extensive study of fire losses in one middle western state which may be considered typical, shows that the majority of the fires and a large proportion of the total loss are the result of just a few common causes. Fortunately this study further shows that these fires are largely preventable.

Sparks on Roofs

These fires are most common in the spring of the year when a deposit of soot which has accumulated during the winter months becomes ignited and lodges on a combustible roof. These burning soot embers, fanned by a breeze, readily ignite old wood shingles and the fire may not be discovered until the entire roof is ablaze.

Inspect the dwelling roof frequently and remove old leaves, pine needles and other trash which may accumulate in the valleys. Wood shingle roofs should be replaced before the shingles become badly weathered and curled, preferably with some fire-resisting roofing material such as metal, tile or slate. A good spark arrester, properly fitted on the chimney, will serve as temporary protection to old roofs. More thought could well be given to the use of fire resistant roofing materials on all buildings on the farm due to the ever-present menace of flying brands from wood shingles.

Defective Chimneys

The entire heating system should be checked regularly each fall and occasionally during the winter operation. Defective chimneys in the attic constitute the greatest source of danger at or near the roof line. Inspect carefully with a flashlight, probing in the mortar joints since some mortar deteriorates rapidly due to the combination of smoke and moisture. If there is no opening into the attic, by all means make one promptly. Chimneys which appear to be sound above the roof may be in a hazardous condition in the attic. When necessary to repair, always rebuild to a point at least two feet below the roof.

The condition of smokepipes and their clearance from combustible walls and ceilings should be carefully noted and they should be replaced or shielded as necessary. All smokepipes should be

anchored securely. Flue openings not in use should be tightly closed by means of a fire resistant flue stop. Do not cover them with wallpaper unless they are permanently filled with mortar.

Lightning

Fire prevention authorities agree that lightning protection systems, properly installed and maintained, are almost 100 per cent effective in preventing damage from this source. The lightning rod systems, particularly on barns and out buildings, should be checked frequently to be sure they are in good condition because a faulty system may be a hazard rather than a protection. Broken conductors should be repaired promptly. All ground conductors should extend 10 feet into the ground to make contact with permanently moist soil. Protection in the form of a wood moulding or a post should be provided for down conductors subject to damage by livestock or vehicles. Air terminals should be spaced not more than 25 feet apart and tightly connected to the conductor. A projection such as a chimney should be protected by a terminal extending two feet above it. Metal hayfork tracks should be connected at each end to the main conductor of the protective system on the barn roof. Litter carrier tracks, metal stanchions and other such bodies of metal should be independently grounded if located more than six feet from the main protective system.

Buildings roofed or roofed and sided with metal sheets may be adequately protected if the sheets are in good contact and grounded at two opposite corners by means of galvanized pipe or standard lightning rod conductors.

Spontaneous Ignition

Check on the condition of the hay frequently for a period of at least six weeks after storage. If undue heating develops it should be carefully watched. Planks should be placed over the surface of the mow in making future inspections to insure safe footing in case the central part has charred and sunk. Using a laboratory type thermometer inserted in a length of pipe driven into the hay, temperature readings should be made at various intervals to determine the points of danger. A reading of 212°F. is a critical one and indicates that the hay may eventually ignite if left in the mow. In preparing for its removal, the local fire department should be on hand ready to soak down the hay in case it bursts into flame. When removed, the hay should be piled some distance from the buildings since it still may ignite.

Recent experiments have shown that carbon dioxide (CO₂), usually available in containers from the local creamery or soda fountain, is useful in cooling the hay in preparation for its removal. This gas is forced into the heated hay through a rubber hose connected to the CO₂ container and inserted in a pipe driven into the hay.

Proper curing of hay in the field to approxi-

mately 25% moisture content or storage in a separate fire-resistant structure are the best methods of safeguarding against this hazard.

Electric Wiring

When the wiring is adequate and correctly installed and maintained, electricity becomes the safest source of heat, light and power. The need for caution in its use however is indicated by the fact that a considerable portion of the nation's fire loss is chargeable to electricity.

Only material bearing the approval of the "Underwriters' Laboratories" or which appear in their published lists should be used. The wiring installation should meet the standards set up by the "National Electrical Code" and the "National Electrical Safety Code" as well as the local state and power company regulations. Additional wiring should meet these same standards.

Existing installations should be inspected at regular intervals. All bare wires should be taped or replaced. Check extension and appliance cords in particular. All wires should be properly supported to avoid danger of a short circuit. Keep a supply of fuses of the proper sizes on hand and do not make replacement until the source of trouble has been located and eliminated. A given size of wire will carry only a certain maximum amount of current safely. It is therefore important that only the proper size fuses be used. Never use a penny behind a fuse or bridge across a fuse.

Hints on Fire Prevention

1. Sparks on roofs and defective flues are the major hazards in dwellings.
2. Spontaneous combustion of hay and straw and lightning on buildings not rodged are the major hazards in barn fires.
3. Carelessness in the use of petroleum products is responsible for many lives lost in fires.
4. Never quicken a sluggish fire with kerosene or gasoline.
5. Paint and grease soiled clothing, rags and cotton gloves may ignite from spontaneous combustion. Store them in a metal container or destroy them.
6. Keep matches in a metal or earthenware container above the reach of children.
7. Smoking in the barn invites fires and careless smokers are a hazard.
8. Grounding wire fences at frequent intervals by using a steel post will help protect livestock from lightning. If all wood posts are used, provide frequent grounds for the fence by means of wires firmly fastened to the fence line wires and to steel rods or pipe driven 18 to 24 inches into the ground.
9. Protect electric wiring systems and repair any breaks in the insulation.
10. Maintain good fuses in all fuse blocks.

Check List for Fire Hazards

I. HEATING SYSTEM:

A. Chimney

1. Above roof ☐ ☐
2. In attic ☐ ☐
3. Flue openings ☐ ☐

B. Stove and Furnace

1. Casing or wall ☐ ☐
2. Clearance ☐ ☐
3. Base ☐ ☐

C. Smokepipe

1. Condition ☐ ☐
2. Support ☐ ☐
3. Clearance ☐ ☐

II. SHINGLE ROOFS ☐ ☐

III. LIGHTNING PROTECTION

- A. Ground Connections ☐ ☐
- B. Conductor ☐ ☐
- C. Points (25 ft. apart or less) ☐ ☐

IV. LIGHTING SYSTEM

- A. Electric wiring ☐ ☐
 1. Fuses ☐ ☐
 2. Insulation ☐ ☐
 3. Support ☐ ☐
- B. Lamps or Lanterns ☐ ☐

V. SPONTANEOUS IGNITION ☐ ☐

VI. OTHER HAZARDS

- A. Gasoline and Kerosene Storage ☐ ☐
 1. Starting fires with kerosene ☐ ☐
 2. Gas engines ☐ ☐
- B. Electrical Household Appliances ☐ ☐
- C. Smoking (No Smoking Sign in Barns) ☐ ☐

VII. FIRE PROTECTION

- A. Ladder ☐ ☐
- B. Fire Extinguishers ☐ ☐
- C. Rural Fire Department ☐ ☐

As you inspect each item and find a hazard existing, place a diagonal mark in the proper square, above. If the hazard has been removed complete the cross in the square. If no hazard is found place a check-mark in the second column.

Silo Safety

Under certain conditions poisonous gases may form in the pit of a silo in which only a small amount of ensilage remains. It is advisable to check for the presence of such a hazard before entering the pit by lowering a lighted kerosene lantern at the end of a rope. If these gases are present in harmful quantities they will have crowded out the oxygen and the flame in the lantern will be extinguished. These gases may be expelled by providing ventilation and then forcing fresh air in by means of a power blower such as provided on an ensilage cutter, directing the flow of air into the pit.

REFERENCE SECTION

Weights and Measures

Cubic Measure

1,728 cubic inches	1 cubic foot
27 cubic feet	1 cubic yard
128 cubic feet	1 cord (wood)
40 cubic feet	1 ton (shipping)
2,150.42 cubic inches	1 standard bushel
231 cubic inches	1 standard gallon
1 cubic foot	about 4/5 of a bushel

Square Measure

144 square inches	1 square foot
9 square feet	1 square yard
30 1/4 square yards	1 square rod
40 square rods	1 rood
4 roods	1 acre
160 square rods	1 acre
640 acres	1 square mile
43,560 square feet	1 acre
6,272,640 square inches	1 acre

Dry Measure

2 pints	1 quart
8 quarts	1 peck
4 pecks	1 bushel
36 bushels	1 chaldron

Liquid Measure

4 gills	1 pint
2 pints	1 quart
4 quarts	1 gallon
31 1/2 gallons	1 barrel
2 barrels	1 hogshead

Avoirdupois Weight

27 11/32 grains	1 dram
16 drams	1 ounce
16 ounces	1 pound
25 pounds	1 quarter
4 quarters	1 hundredweight
2,000 pounds	1 ton
2,240 pounds	1 long ton

Long Measure

12 inches	1 foot
3 feet	1 yard
5 1/2 yards or 16 1/2 feet	1 rod
40 rods	1 furlong
8 furlongs or 5,280 feet	1 statute mile
3 miles	1 league

Surveyor's Measure

7.92 inches	1 link
25 links	1 rod
4 rods	1 chain
10 square chains or 160 square rods	1 acre
640 acres	1 square mile or section
36 square miles	1 township

Mariner's Measure

6 feet	1 fathom
120 fathoms	1 cable length
7 1/2 cable lengths	1 mile
5,280 feet	1 statute mile
6,080 feet	1 nautical mile
3 marine miles	1 marine league

Miscellaneous

9 inches	1 span
12 dozen	1 gross
1 U. S. gallon	231 cubic inches
1 British (Canadian) gallon	277.274 cubic inches
1 pint of water weighs	1.0431 lbs.
1 gallon of water weighs	8.3448 lbs.
1 knot	1 1/6 mile
100 pounds of nails	1 keg
196 pounds flour	1 barrel
150 pounds potatoes	1 barrel
280 pounds salt	1 barrel
1 lb. of wheat is about	1 pint
1 lb. of soft butter is about	1 pint
1 lb. of sugar is about	1 pint
1 foot is about	.3 of a meter
1 yard is about	.9 of a meter
1 rod is about	5 meters

Compound Interest

Principal of money loaned doubles at:

2 per cent in 35 years and	1 day.
2 1/2 per cent in 28 years and	25.6 days.
3 per cent in 23 years and	162.81 days.
3 1/2 per cent in 20 years and	53.51 days.
4 per cent in 17 years and	244.06 days.
4 1/2 per cent in 15 years and	271.25 days.
5 per cent in 14 years and	74 days.
6 per cent in 11 years and	325.88 days.

The interest compounded annually for any number of dollars may be found by multiplying the interest for \$1.00 by the given number.

To Determine the Capacity of Field Machines

The approximate capacity in acres per ten-hour day, of a field machine may be obtained by multiplying its effective width, in feet, by the average speed, in miles per hour, at which it is operated. To determine the average capacity per hour divide the figure thus obtained by ten.

To Determine Water Pressure

To find the pressure in pounds per square inch, of a column of water, multiply the height of the column, in feet, by .434.

Horsepower Equivalent

A horsepower is equivalent to raising 33,000 pounds one foot per minute, or 550 pounds one foot per second.

Tank Capacity in Gallons

To determine the capacity of a tank in gallons, multiply the capacity in cubic feet by 7 1/2. One cubic foot of water weighs 62 1/2 pounds.

To Compute Board Feet

A board foot is the equivalent of a piece of lumber 1 inch thick, 12 inches wide and 1 foot long, or in other words a square foot of lumber 1 inch thick.

To find the number of board feet in a piece of lumber:

1. Multiply together:

Thickness in inches x $\frac{\text{Width in inches}}{12}$ x length
in feet, or

2. Multiply square feet of surface by thickness in inches.

Doubling any single dimension of a piece of lumber doubles its volume, doubling two dimensions increases its volume fourfold, and doubling three dimensions increases the volume eightfold.

To Change Board Feet to Lineal Feet

Multiply Board Feet of 1" x 2" by 6.
Multiply Board Feet of 1" x 3" by 4.
Multiply Board Feet of 1" x 4" by 3.
Multiply Board Feet of 1" x 5" by $2\frac{2}{5}$.
Multiply Board Feet of 1" x 6" by 2.
Multiply Board Feet of 1" x 8" by $1\frac{1}{2}$.
Multiply Board Feet of 1" x 10" by $1\frac{1}{5}$.
Multiply Board Feet of 1" x 12" by 1.

Weights of Common Nails

Size	Length Inches	Gauge Number	Diameter of Head	Approx. Number to Lb.
2d	1	15	7 Ga.	876
3d	$1\frac{1}{4}$	14	6 Ga.	568
4d	$1\frac{1}{2}$	$12\frac{1}{2}$	4 Ga.	316
5d	$1\frac{3}{4}$	$12\frac{1}{2}$	4 Ga.	271
6d	2	$11\frac{1}{2}$	$2\frac{1}{2}$ Ga.	181
7d	$2\frac{1}{4}$	$11\frac{1}{2}$	$2\frac{1}{2}$ Ga.	161
8d	$2\frac{1}{2}$	$10\frac{1}{4}$	$1\frac{1}{2}$ Ga.	106
9d	$2\frac{3}{4}$	$10\frac{1}{4}$	$1\frac{1}{2}$ Ga.	96
10d	3	9	$0\frac{1}{2}$ Ga.	69
12d	$3\frac{1}{4}$	9	0 Ga.	63
16d	$3\frac{1}{2}$	8	$\frac{11}{16}$ -In.	49
20d	4	6	$\frac{3}{8}$ -In.	31
30d	$4\frac{1}{2}$	5	$\frac{11}{16}$ -In.	24
40d	5	4	$\frac{1}{2}$ -In.	18
50d	$5\frac{1}{2}$	3	$\frac{3}{4}$ -In.	14
60d	6	2	$\frac{7}{8}$ -In.	11

To Estimate Quantities of Grain and Hay

Bushels of Grain or Shelled Corn in Bin: Multiply the length by the width by the depth (all in feet) and divide by $1\frac{1}{4}$.

Bushels of Ear Corn in Crib: Multiply the length by the width by the average depth (all in feet) and multiply by $\frac{2}{5}$. If the crib is round, multiply the distance around the crib by the diameter by the depth of the corn (all in feet) and divide by 10.

Tons of Hay in Mow: Multiply the length by the width by the height (all in feet) and divide by 400 to 500, depending on the kind of hay and how long it has been in the mow.

Tons of Hay in Stack: Multiply the overthrow (the distance from the ground on one side over the top of the stack to the ground on the other side) by the length by the width (all in feet); multiply by 3; divide by 10 and then divide by 500 to 600.

Properties of the Circle

To obtain the area of a circle, square the diameter and multiply by .7854 or square the radius and multiply by 3.1416.

To obtain the circumference of a circle multiply the diameter by 3.1416.

To obtain the diameter of a circle multiply the circumference by .3183.

Circumference and Areas of Circles

Diameter in Inches	Circum- ference in Inches	Area Square Inches	Area Square Feet
1	3.142	.7854	.005454
2	6.283	3.1416	.021816
3	9.425	7.0686	.049081
4	12.566	12.5664	.087266
5	15.708	19.6350	.136354
6	18.850	28.2743	.196350
7	21.991	38.4845	.267254
8	25.133	50.2655	.349066
9	28.274	63.6173	.441786
10	31.416	78.5398	.545415

Livestock Weights and Yields

The average live weight and the percentage of yield in meat of livestock dressed by commercial packing plants during 1933, as reported by the U. S. Department of Agriculture, were as follows:

	Average Live Weight	Average Yield in meat
Beef Cattle	954 lbs.	55 per cent
Calves	179 "	58 "
Hogs	231 "	76 " (a)
Sheep and Lambs	82 "	47 "

(a) Dressed carcass yield. (The finished yield of pork and rendered lard is only about 70 per cent.)

Capacity of Silos

Depth of silage after settling two days (Feet)	Inside diameter of silo in feet					
	10	12	14	16	18	20
2	2	2	3	4	5	6
4	3	5	7	9	11	13
6	5	8	11	14	17	21
8	8	11	15	20	25	31
10	10	15	20	26	33	41
12	13	19	25	33	42	52
14	16	23	31	41	52	64
15	18	25	34	45	57	70
16	19	28	38	49	62	77
17	21	30	41	53	67	83
18	23	32	44	58	73	90
19	24	35	48	62	79	97
20	26	38	51	67	85	105
21	28	40	55	72	91	112
22	30	43	59	77	97	120
23	32	46	63	82	103	128
24	34	49	66	87	110	135
25	36	52	70	92	116	143
26	38	55	74	97	123	152
27	40	58	79	103	130	160
28	42	61	83	108	137	169
29	44	64	87	114	144	178
30	47	67	91	119	151	187
31	49	70	96	125	158	195
32	51	74	100	131	166	205
33	53	77	105	138	173	214
34	56	80	109	143	181	224
35	58	84	114	149	188	232
36	61	87	118	155	196	242
37	63	90	123	161	204	252
38	66	94	128	167	212	262
39	68	97	133	174	221	272
40	70	101	138	180	229	280

Estimating Amount of Silage Remaining in Silo

What is left in a silo after part has been used can be estimated as follows:

Find original amount of silage put in silo by referring to table. Find amount of silage that has been used by same method, using as depth the difference between present depth and depth two days after filling. Subtract amount used from original amount. The difference is approximate amount of silage remaining in silo.

Example: A silo 16' in diameter and 32' high was filled so that after settling two days there was 26' of silage. At time inventory was taken there was 12' of silage left. From the table it is seen that 26' of silage in a 16' silo = 97 tons. Since 12' of silage was left, 14' had been fed, and 14' of silage in a 16' silo = 41 tons. Therefore, the bottom 12' of silage in this silo would contain about 56 tons of silage, since 97 tons minus 41 tons = 56 tons.

Cornell University

Daily Feeding From Silo

(Basis of 40 pounds of silage per cubic foot)

WINTER FEEDING TO A DEPTH OF TWO INCHES DAILY

Inside diameter of silo (feet)	Numbers of animals that may be fed, allowing—			
	40 lbs. per head	30 lbs. per head	20 lbs. per head	15 lbs. per head
	Animals	Animals	Animals	Animals
10	13	17	26	35
11	16	21	31	42
12	19	25	37	50
13	22	29	44	59
14	25	34	51	68
15	29	39	59	78
16	33	44	67	89
17	38	50	75	101
18	42	56	85	113
20	52	70	104	139

SUMMER FEEDING TO A DEPTH OF THREE INCHES DAILY

10	19	26	39	52
11	23	31	47	63
12	28	37	56	75
13	33	44	66	88
14	38	51	77	102
15	44	59	88	118
16	50	67	100	134

Average Stomach Capacity

Hog	8 quarts
Horse	19 quarts
Sheep	31 quarts
Cow	266 quarts

Milk Per Pound of Butter

	Per cent	Pounds	Quarts
Milk testing	3.0	28.56	13.28
Milk testing	3.6	24.2	11.07
Milk testing	3.8	22.9	10.48
Milk testing	4.0	21.7	9.96
Milk testing	4.2	20.7	9.49

Weight of Dairy Products

Article	Specific gravity	Weight of gal.—pounds	Weight of qt.—pounds
Pure milk	1.000	8.342	2.085
Skim milk	1.036	8.642	2.160
Whole milk	1.032	8.609	2.152
20 per cent cream	1.022	8.525	2.131
24 per cent cream	1.009	8.417	2.104
30 per cent cream	1.001	8.350	2.087
40 per cent cream		8.220	2.055
50 per cent cream		8.112	2.028
Pure butterfat	0.910	7.591	1.898

Commodity Measures and Weights

Commodity	Unit ¹	Approximate net weight
		<i>Pounds</i>
Alfalfa seed	Bushel	60
Apples, fresh	Bushel	48
Barley	Barrel	140
Beans:	Bushel	48
Lima, dry	Bushel	56
Other, dry	Bushel	60
Lima, unshelled	Sack	100
Snap	Bushel	32
Bluegrass seed	Bushel	30
Buckwheat	Bushel	14-30
Butter	Bushel	48-52
Cabbage	Tub	63
	1½-bushel hamper	50
Carrots:		
Without tops	Bushel	50
Clover seed	Bushel	60
Corn:		
Ear, husked	Bushel	70
Shelled	Bushel	56
Green, sweet	Bushel	35
Meal	Bushel	50
Oil	Gallon	Av. 7.5
Sirup	Gallon	11.5
Cowpeas	Bushel	60
Cream, 30-percent butterfat	Gallon	8.43
Eggs, average size	Case, 30 doz.	45
Flaxseed	Bushel	56
Flour, various	Barrel	196
Grain sorghums	Bushel	56 and 50
Hempseed	Bushel	44
Honey	Gallon	12
Hungarian millet seed	Bushel	48 and 50
Kafir	Bushel	56 and 50
Linseed oil	Gallon	Av. 7.5
Malt	Bushel	34
Maple sirup	Gallon	11
Milk (specific gravity 1.032)	Gallon	8.6
Millet	Bushel	48-50
Molasses	Gallon	11.75
Oats	Bushel	32
	Sack	100
Onions, dry	Sack	50
	Bushel, late	57
	Bushel, early	50
Onions, green, bunched	Crate	50-55
Onion sets	Bushel	28-32
Orchard grass seed	Bushel	14
Pears	Bushel	50
Peas:		
Green, unshelled	Bushel	30
Dry	Bushel	60
Perilla seed	Bushel	37-40
Popcorn:		
On ear	Bushel	70
Shelled	Bushel	56
Potatoes	Bushel	60
	Barrel	165
Rapeseed	Bushel	50 and 60
Redtop seed	Bushel	14-40
Rice:		
Rough	Bushel	45
	Bag	100
	Barrel	162
Milled	Pocket or bag	100
Rye	Bushel	56
Sesame seed	Bushel	46
Sorgo:		
Seed	Bushel	50
Sirup	Gallon	11.4

¹ See footnote at end of table.

Commodity Measures and Weights

(Continued)

Commodity	Unit ¹	Approximate net weight
		<i>Pounds</i>
Soybeans	Bushel	60
Soybean oil	Gallon	7.5
Spelt	Bushel	40
Sudan grass seed	Bushel	40
Sugarcane sirup	Gallon	11.25
Sunflower seed	Bushel	24 and 32
Sweet potatoes	Bushel	55
Timothy seed	Bushel	45
Turpentine	Gallon	7.23
Velvetbeans (hulled)	Bushel	60
Vetch	Bushel	60
Water, 60° F	Gallon	8.33
Wheat	Bushel	60
Various commodities	Short ton	2,000

¹ Standard bushel used in the United States contains 2,150.42 cubic inches; the gallon, 231 cubic inches and the standard fruit and vegetable barrel, 7,056 cubic inches. Such large-sized products as apples and potatoes are sometimes sold on the basis of a heaped bushel, which would exceed somewhat the 2,150.42 cubic inches of a bushel basket level full. This also applies to such products as sweet potatoes, peaches, green beans, green peas, spinach, etc.

From U. S. Department of Agriculture

Commodity Conversion Factors

Commodity	Unit	Approximate equivalent
Barley flour	1 barrel (196 lbs.)	9 bus. barley
Beans, lima	1 lb. shelled	2 lbs. unshelled
Buckwheat flour	1 barrel (196 lbs.)	7 bus. buckwheat
Cane sirup	1 gallon	5 lbs. sugar
Corn, shelled	1 bushel (56 lbs.)	2 bus. (70 lbs.) of husked ear corn
Corn meal:		
Degermed	1 barrel (196 lbs.)	6 bus. corn
Nondegermed	1 barrel (196 lbs.)	4 bus. corn
Cotton	1 lb. ginned	2.86 lbs. unginned
Dairy products:		
Butter	1 lb.	21 lbs. milk
Cheese	1 lb.	10 lbs. milk
Cond. milk, whole	1 lb.	2.2 lbs. milk
Evap. milk, whole	1 lb.	2.2 lbs. milk
Ice cream	1 gallon	15 lbs. milk
Malted milk	1 lb.	2.6 lbs. milk
Powdered milk	1 lb.	8 lbs. milk
Powdered cream	1 lb.	19 lbs. milk
Eggs	1 case (45 lbs.)	35.3 lbs. frozen or liquid eggs
Flaxseed	1 bushel	Yields about 2½ gallons oil
Linseed oil	1 gallon	From .04 bus. flaxseed
Malt	1.1 bushels	1 bu. barley
Maple Sirup	1 gallon	8 lbs. sugar
Oatmeal	1 barrel (196 lbs.)	10-8/9 bus. oats
Peanuts	1 lb. shelled	1½ lbs. unshelled
Peas, green	1 lb. shelled	2.5 lbs. unshelled
Rice	1 lb. milled	1.62 lbs. rough or unhulled rice
Rye flour	1 barrel (196 lbs.)	6 bus. rye
Wheat flour	1 barrel (196 lbs.)	4.7 bus. wheat
Wool	1 lb. scoured	2 lbs. grease
Wool	1 lb. pulled	1⅓ lbs. grease

From U. S. Department of Agriculture

Attach Reference Clippings to this Page

REPUBLIC STEEL PRODUCTS FOR THE FARM

For complete information, ask your dealer

REPUBLIC FARM FENCE



Republic Woven Wire Farm Fence is made of highly rust-resisting copper-bearing steel, heavily galvanized to withstand the ravages of time and weather. The line includes a full range of heights and styles, such as Hog, Stock and Field Fence; Sheep, Horse and Cattle Fence; and Wolf-Proof Fence—all furnished in 20 and 40-rod rolls.

REPUBLIC POULTRY FENCE

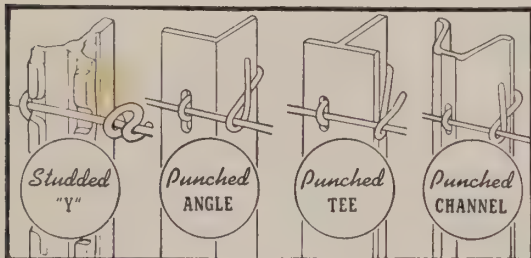
A wide choice is offered in Republic Poultry Fence. Made of galvanized copper-bearing steel wire in lighter gauges than field fence because it is usually subjected to less severe service. Heights up to 72 inches and rolls of 150 feet, 10 and 20 rods, are available. Produced in 13, 14½, 15½ and 17 gauge.

REPUBLIC POULTRY NETTING

This netting is available galvanized either before or after weaving. Galvanizing after weaving produces a heavier and more durable coating. Heights range from 12 to 72 inches. Mesh size—1 and 2 inches. Straight line or hexagon. Supplied in 150-foot rolls.

REPUBLIC BARBED WIRE

Styles of galvanized barbed wire differ in number and shape of the barbs and the spacing of the barbs on the line wires. Two-point barbs are spaced 3 inches for hogs and 5 inches for cattle; four-point—4 inches for hogs and 6 inches for cattle. Furnished in 80-rod spools.



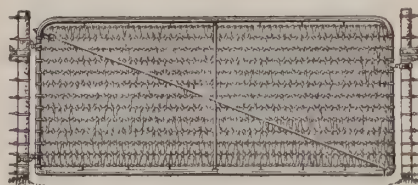
REPUBLIC STEEL FENCE POSTS

These sturdy posts can be driven rapidly and are easily handled. They are made from high quality rail carbon steel in several styles for use as line posts. End and corner posts are made in angle and tubular types. Line posts are made in lengths ranging from 5 to 8 feet. End and corner posts range from 7 to 9 feet in length.

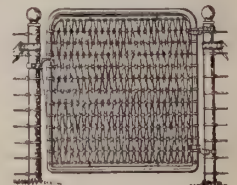
REPUBLIC LAWN FENCE

This ornamental fence is made in both single and double picket styles in heights ranging from 24 to 48 inches in 100, 165 and 330 foot rolls. Flower guard and trellis are furnished in the same length rolls as the fence. Heavily galvanized to resist weather.

REPUBLIC FENCE GATES



Furnished in different widths and heights for both drives and walks. Ornamental gates are available for use with ornamental lawn fence.



REPUBLIC BALE TIES



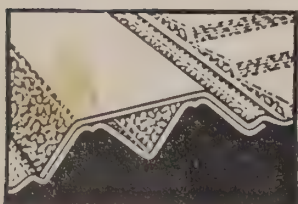
Republic Single Loop Bale Ties are made in both round and long oval loop styles. Spiral wrapped in lengths from 7½ to 10¼ feet and in gauges from 12 to 16½. Look for the Yellow Jacket.



REPUBLIC WIRE NAILS

Republic Nails are available in a complete range of styles and sizes. Made of special analysis copper-bearing steel wire, the nails have straight shanks, sharp points and well-centered heads. Outstanding is the famous Republic Triple Lock Lead Seal Roofing Nail, a galvanized drive screw type nail which is unexcelled for roofing work.

REPUBLIC ROOFING PRODUCTS

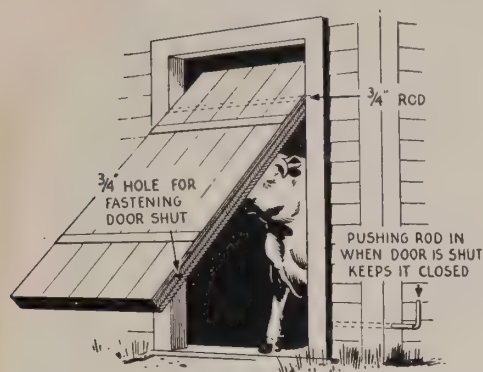


A roofing product for every roofing need on the farm. Styles include Republic Triple Drain Roofing, a scientifically designed special channel drain roofing product which has met with great success; flat and corrugated galvanized sheets; V-crimped in 2, 3, 4, 5 and 6-V styles; roll roofing, pressed standing seam roofing and a complete line of accessories such as ridge roll, gable end starters, end wall flashing, gambrel roof joints, flared eave joint, overhang eaves drip, eaves troughs and spouting.

Available in a range of sizes and gauges in open hearth steel or copper-bearing steel. Toncan Copper Molybdenum Iron available for maximum resistance to rust and corrosion.

REPUBLIC STEEL CORPORATION

Safety Door for Bulls



You don't have to take chances with a dangerous bull with this type of door. Fasten a piece of $\frac{3}{4}$ " or 1" steel rod about 4 to 6 inches wider than the doorway to the door about $\frac{1}{4}$ of the way down from the top. Heavy strap iron loops can be used for this purpose or, if the door is thick enough, the rod can be passed through it. Drill holes into the jamb on either side for the projecting ends of the bar to fit into. The door will swing either in or out when the bull wants to get through and it is not necessary to get into the pen or exercise yard to open it. If the door is near a corner, it can be held shut when closed, by drilling a hole in one side near the bottom so that it will receive a piece of $\frac{3}{4}$ " rod which can be pushed through holes drilled in the studs and door jamb.

Estimating Age of Cattle

From a practical standpoint the age of cattle is usually determined by the horns, the length of the tail, and the general appearance of the animal. However, the time of eruption of the teeth is a rather accurate guide.

There are four pairs of temporary incisors in the lower jaw that usually appear during the first few weeks of life. They are replaced by an equal number of permanent incisors that erupt about as follows:

Teeth	Age of eruption in months
First or middle pair incisors..	15 to 18
Second pair incisors.....	24 to 30
Third pair incisors.....	33 to 36
Fourth pair incisors	42 to 48

Breaking Sucking Cows

Some cows can be successfully broken of the habit of sucking themselves with the impediment of a horse collar around the neck. Try the treatment for a period; then remove the collar. If the cow attempts to return to her old habits, replace the collar. Repeat until cure is effected or cow indicates a hopeless case.

Suggested Rations for Beef Cattle

Average daily rations for fattening calves, starting at 400 lbs. weight and gaining 400 to 500 lbs. in 180 to 240 days.

No. 1

Corn or barley or part oats	7.5 lbs.
Cottonseed or soybean or linseed oil meal	1.3 lbs.
Corn silage	18.0 lbs.
Legume or mixed hay.....	3.5 lbs.

No. 2

Corn or barley or part oats ...	11.0 lbs.
Cottonseed or soybean or linseed oil meal	1.3 lbs.
Corn silage	8.0 lbs.
Legume or mixed hay	3.0 lbs.

No. 3

Corn or barley or part oats ...	12.0 lbs.
Cottonseed or soybean or linseed oil meal	1.1 lbs.
Legume or mixed hay or some corn stover	6.0 lbs.

Equal parts special steamed feeding bone meal and granulated salt should be available at all times, not in the feed.

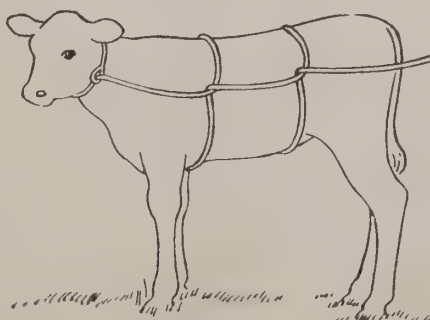
Molasses may replace grain in the above rations. More than 2 lbs. per day of beet molasses may be too laxative.

Many other feeds may be substituted for feeds of similar composition in these rations.

The longer the feeding period the more roughage can be used in the beginning to conserve grain for the finish, however, gains of less than 40 pounds per month in the beginning or 60 pounds per month toward the finish are likely to be costly. The higher the grade of cattle, the better ration and the longer the feeding period advisable.

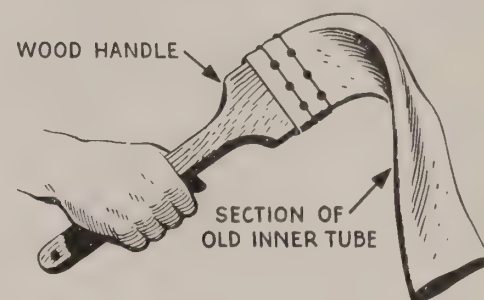
Yearling steers may be fed similar rations to those above with increased amounts according to weights of the cattle. Coarser feeds, such as shock corn, corn stover, non-legume hay, etc., may be used more readily by these older cattle.

Rope Trick Throws Cattle



To throw a calf or bull, put a rope around the neck, and a half-hitch around the flanks as shown in illustration. Pull on the rope and the animal will come down easily.

Livestock Slapper



Here's a simple little device that will keep livestock moving when driving or loading into a truck or trailer without running the risk of bruising which attends the customary use of a club, stick, stone or fork. Just take a piece of an old inner tube about two feet long and a board wide enough to fit inside the tube. Whittle one end of the board down to form a comfortable handle and insert the other end inside the tube about four inches. Fasten the tube securely to the handle with wire and tacks and you will have a humane slapper that will keep the animals moving just as effectively as a club. A hole drilled in the end of the handle permits the slapper to be hung on a convenient nail.

Suggested Rations for Dairy Cattle

The following mixtures are suitable when fed with good legume hay:

(1)

200 lbs. corn
300 lbs. oats
200 lbs. bran
300 lbs. soybean oil meal

(2)

200 lbs. corn
200 lbs. oats
200 lbs. bran
200 lbs. linseed oil meal
200 lbs. soybean oil meal

The corn and oats should be coarsely ground.

The following concentrate mixture is recommended:

600 lbs. ground corn
200 lbs. wheat bran
200 lbs. linseed meal or soybean oil meal

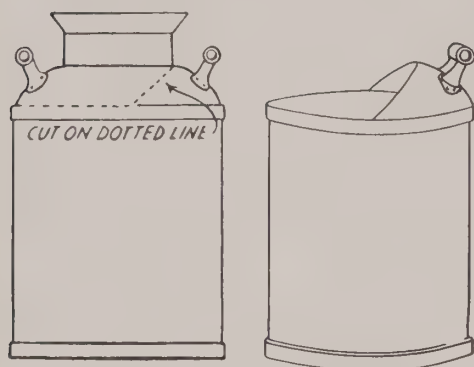
Up to one-half corn may be replaced with oats.

(From "Raising Dairy Calves", University of Wisconsin Extension Service Circular 305.)

Holder for Calf's Feed Pail

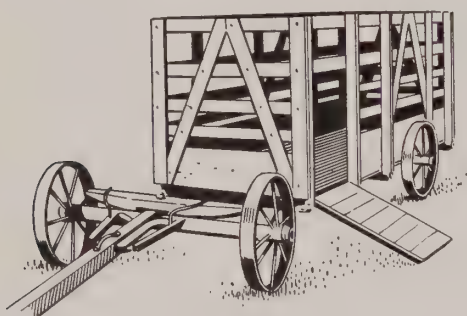
Saw an old barrel in half and cut a round hole in the top just big enough to hold a calf's feeding pail. This will prevent spilling of the feed.

Use for Old Milk Cans



Don't throw away your old milk cans. With slight alterations they can be made into handy containers for carrying feed and for other uses about the farm. Trim them as shown in the sketch. After cutting off tops be sure edges are bent in so as not to be dangerous. One of the advantages of these containers are that they are easy to clean.

Animal Ambulance



To avoid danger of infection when moving sows and litters to pasture, one farmer uses the animal ambulance illustrated above. The body is built on an old wagon frame or an old automobile chassis. It should be equipped with small wheels so that the animals can climb into it easily. The gate, when let down, forms a ramp for loading and unloading.

Preventing Waste of Straw

To keep cattle and other livestock from spreading and wasting straw or hay in the stack, place ordinary woven wire fencing around the base of the stack.

Avoid "Double Dosing" of Stock

When giving medicine to such livestock as sheep on drenching days, the danger of administering a double-dose to one animal can be avoided by marking the sheep across the top of the head with a piece of ordinary carpenter's chalk before releasing.

Estimating Age of Sheep

The time of eruption of the permanent incisors provides a rather accurate method of determining the age of sheep. There are 4 pairs of them, all in the lower jaw, and they may be expected to come in about as follows:

Teeth	Age of eruption in months
First or middle pair.....	12
Second pair	24 to 27
Third pair	33 to 37
Fourth pair	48

Precautions at Lambing Time

If all of the lambs are to be saved give strict attention to the following recommendations:

1. Have lambs born in clean quarters.
2. Apply tincture of iodine to the navel soon after birth.
3. Do not allow the lambs to become chilled.
4. See that the ewe has milk, that her udder is normal, her teats open and that the lamb gets milk.
5. Provide reasonable protection from severe weather until the lambs are a few weeks old.

Controlling Greedy Horses

A large smooth stone in the middle of the feed box will effectively slow down horses that eat too rapidly or throw their feed out of the box.

Stop Horse Chasing Livestock

If you have a horse that seems to enjoy the sport of chasing other livestock in the pasture, try this one. Fasten a short chain or plow clevis to the horse's front leg behind the knee. This should effectively discourage the chasing habit.

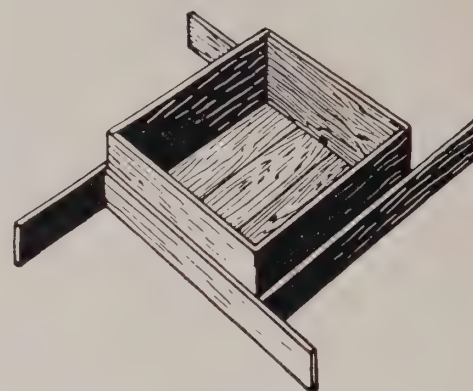
Stops Chewing on Mangers

To stop horses from chewing the upper edge of wooden mangers, staple smooth wires, one on the top inside edge and another on the top outside edge. This will effectively discourage the chewing habit.

Stop Cows Splashing Water

If you have trouble with your cows lapping drinking water and splashing it into the feed and bedding, you can correct the situation. Put an ordinary screen wire horse muzzle into the drinking cup. The upper rim of the muzzle should be caught up under the inner edge of the drinking cup.

Stock Salt Box

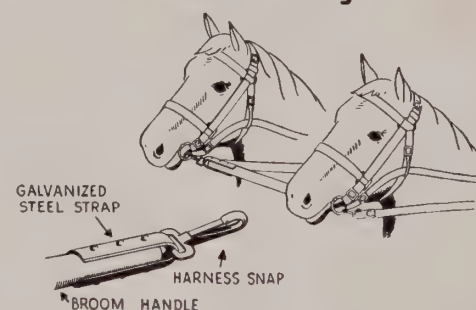


You can't always be assured of a clean supply of salt handy to your stock at all times if the salt box is usually upside down in the barnyard. An ordinary box invariably is overturned by stock in getting at the salt block.

However, you can overcome this difficulty by nailing four boards around the outside of the box, arranging them so that one end of each board is flush with a corner of the box, and the other end projects eight or ten inches. Nail a board in this manner to each side of the box, progressing around the box so the projection of each board is always to the right. This arrangement makes a broad base for the box which, in most cases, is sufficient to keep it from being upset.

If this is still insufficient, take four pieces of 2"x6" four feet long and nail them together in the same way as the sides were added to the box above, leaving about a one-foot square in the center. Put a bottom in the center square for the salt, and you have a heavy, well-supported salt box that rarely, if ever, will be overturned by stock. In most cases, the first suggestion is effective enough.

Prevent Horses Eating Corn When Cultivating



Using a narrow strip of heavy gauge galvanized steel for straps, fasten a harness clip to each end of a piece of broom handle about 24 to 30 inches long. When using a horse-drawn cultivator for corn, snap one of the harness snaps to the inside bit ring of each horse. This will keep the horses from eating the corn.

SAFETY SECTION

Artificial Respiration



If a person is not breathing, give emergency First Aid by the prone pressure method at once, as follows:

1. Lay the patient on his stomach with one arm extended, the other bent at the elbow so that his face, turned outward, rests on his hand or forearm.
2. Kneel, straddling the patient's thighs. (Fig. 1.)
3. Place the palms of your hands on the small of his back, with little fingers just touching the lowest ribs.
4. With arms extended swing forward gradually, bringing weight of your body to bear upon patient. (Fig. 2. This compresses the lungs.) Take about two seconds for this operation.
5. Immediately swing back to remove the pressure. (Fig. 3. This allows the lungs to expand.)
6. After two seconds, swing forward again—and repeat the entire procedure 12 to 15 times a minute.
7. While artificial respiration is being continued, have someone loosen any tight clothing. Keep the patient warm and lying down. Do not give liquids by mouth until he is fully conscious.
8. If breathing again stops, renew artificial respiration. Continue for several hours, if necessary.

Check List for Fire Hazards

I. Heating System:

- | | |
|---------------------------|---|
| A. Chimney | |
| 1. Above roof | ☐ ☐ |
| 2. In attic | ☐ ☐ |
| 3. Flue openings | ☐ ☐ |
| B. Stove and Furnace | |
| 1. Casing or wall | ☐ ☐ |
| 2. Clearance | ☐ ☐ |
| 3. Base | ☐ ☐ |
| C. Smokepipe | |
| 1. Condition | ☐ ☐ |
| 2. Support | ☐ ☐ |
| 3. Clearance | ☐ ☐ |

II. Shingle Roofs

III. Lightning Protection

- | | |
|--|---|
| A. Ground connections .. | ☐ ☐ |
| B. Conductor | ☐ ☐ |
| C. Points (25 ft. apart or less) | ☐ ☐ |

IV. Lighting System

- | | |
|--------------------------|---|
| A. Electric wiring | ☐ ☐ |
| 1. Fuses | ☐ ☐ |
| 2. Insulation | ☐ ☐ |
| 3. Support | ☐ ☐ |
| B. Lamps or Lanterns ... | ☐ ☐ |

V. Spontaneous Ignition ...

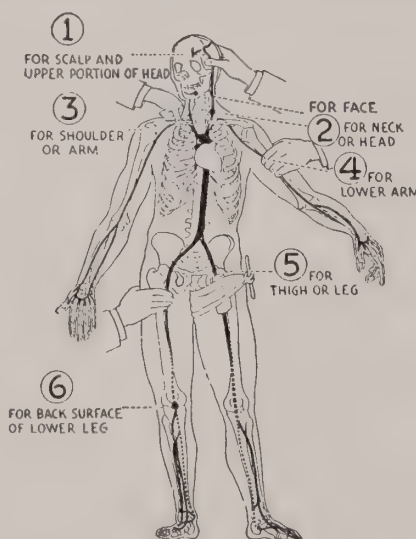
VI. Other Hazards

- | | |
|---|---|
| A. Gasoline and Kerosene storage | ☐ ☐ |
| 1. Starting fires with kerosene | ☐ ☐ |
| 2. Gas engines | ☐ ☐ |
| B. Electrical household appliances | ☐ ☐ |
| C. Smoking (No Smoking sign in barns) | ☐ ☐ |

VII. Fire Protection

- | | |
|----------------------------|---|
| A. Ladder | ☐ ☐ |
| B. Fire Extinguishers | ☐ ☐ |
| C. Rural Fire Dept. | ☐ ☐ |

Applying Pressure to Stop Bleeding



Tourniquets are useful in two locations: At point No. 4 about the middle of the upper arm and at point No. 5 in the groin. These two points should take care of bleeding at any place below them. Pressure should be applied tight enough to stop the blood from spurting and should be released every 15 minutes; if bleeding starts again the bandage should be tightened.

You should feel the pulse in every case, otherwise you are not pressing the artery. Pressure should be sufficient to stop this pulsation.

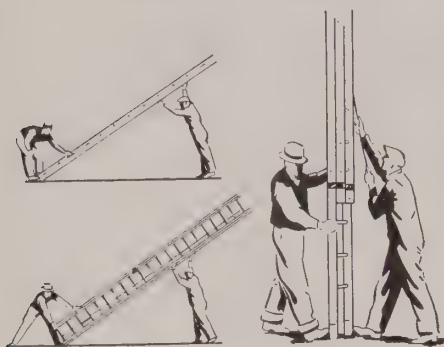
Safety of the Small Child

1. Select toys and playthings with the safety of children always in mind.
2. Do not allow children to play with metal toys which have sharp points or edges.
3. Serious falls may be caused by toys left on steps, stairways and walks.
4. Small children have a way of putting anything into their mouths and are easily choked.
5. Avoid throwing razor blades, bottles and medicines into waste baskets; children may find them.
6. Keep matches where children cannot get them; put the sticks of "dead" matches, cigar and cigaret butts into closed containers.
7. Do not permit small children to play with tools; or to play where tools may fall on them.
8. Protect children from open fires, from kitchen stoves and all cooking vessels, and from kitchen utensils and other objects which might fall on them or be pulled over on them.

Safety in the Kitchen

1. Have the stove fitted with safety cocks, so that gas petcocks cannot be turned without releasing a clip.
2. Keep the handles of cooking pans and pots turned so that children cannot grasp them.
3. Place matches securely beyond a child's reach, and teach him to respect and avoid fire.
4. Place sharp knives well back on the table; do not carry knives about unnecessarily; keep them in drawers.
5. Open the oven door and leave it open for several minutes before turning on gas and applying a match.
6. Cover the hand with a cloth before opening a steaming vessel or roaster; lift the far side of the cover first.
7. Beware of hot grease spattering on hands or arms; apply first aid, or summon a doctor for any serious burn or cut.
8. Take time and care in using grinders, beaters, slicers and all other power-driven appliances; be sure the extension cord is of approved make and in good condition.
9. Open tin cans with a proper appliance; dispose of bottles and refuse where children cannot find them.

Setting Up a Ladder



1. Select a ladder with suitable safety feet; otherwise, block or tie the base, or have someone hold it.
2. Be sure rungs and side rails are in sound condition.
3. Place ladder feet parallel with wall or other solid backing. It is unsafe to rest a ladder against loose boxes, round objects, or other insecure backing, unless it is tied so that it cannot fall.
4. The best angle for a ladder is about 75 degrees with the horizontal. Have the base about $\frac{1}{4}$ of the ladder length out from the bottom of the object it leans against. In other words, place the base of a 12-foot ladder 3 feet from the object it leans against.
5. If the ladder is placed before a doorway, lock the door or have someone guard it. Protect the ladder base from traffic, if necessary.
6. When using a stepladder, make sure it is fully extended before you climb.
7. If an extension ladder is used, follow the sketches and instructions below to avoid accidents when raising and extending it.
 - (a) Wait until the ladder is raised to a vertical position, then extend it. Be sure to watch where you put your fingers, lest they be crushed.
 - (b) To lower the ladder, simply reverse the operation, but first raise the upper section just enough to release the hook so it can be lowered.

Climbing Ladders

1. If your shoes are muddy or otherwise slippery, clean them before you climb.
2. Always face the ladder and hold on with both hands, whether climbing up or down.
3. Carry tools in suitable pockets; or have tools and all other objects hoisted with rope and bucket.

Working From Ladders

1. Work facing the ladder and hold on with one hand.
2. Use a safety belt if the character of the work requires it.
3. It is dangerous to reach out too far from a ladder in any direction; move the ladder as the work may require.
4. Avoid the use of two ladders spliced together; get one long enough to reach the job.
5. It is unsafe to use a ladder as a horizontal member of a scaffold.
6. When using ladders on roofs or other high places, lash them securely. Do not work in a high wind.

Brush Painting From Ladders

Brush painters should take every precaution in climbing and working from ladders. Important safety suggestions include the following:

1. Have plenty of clearance on each side, also in front of and behind the ladder.
2. Do not lean a ladder against window sash; fasten a board to the ladder top as a bearing on each side of the window frame.
3. Hang the paint bucket from a ladder rung by a suitable hook; hold to the ladder with one hand while painting.
4. It is dangerous to reach out too far in any direction from a ladder; climb down and move the ladder, as may be necessary.

In Case of Fire

When a fire is discovered in the daytime, it is usually small. A rug or a heavy garment may smother it; a fire extinguisher may easily put it out.

But if the fire, when discovered, is already large, warn other persons in the house, and summon assistance immediately.

1. If fire-fighting service is available, notify the fire department. If you telephone, explain clearly that you want to report a fire; give the correct location.
2. If at night you smell smoke, do not open your closed door at once. Flame and smoke rushing in about you might be fatal. Feel of the door first; if it is not warm, open it with caution.
3. If there is dense smoke but no flame, get on your hands and knees (the air is purer at the floor level) and crawl to safety. Cover your mouth and nose with a damp cloth, if possible.

To Avoid Injury When Lifting



1. You may be as strong as an ox but be careful what you lift. Even if your back muscles were made of steel there would be a limit to the strain they would stand.
2. Size up the load before you lift it. Get help if necessary.
3. Lift with your legs and not your back.

Home Fire Precautions

Fire threatens disaster to every home. Here are some things to do to prevent home fires.

1. Do not smoke in bed. Put matches, cigar and cigaret butts in metal containers.
2. Completely enclose wood and coal fireplaces with wire screen.
3. Be sure floor lamps and extension cords are in good repair.
4. Disconnect electric appliances as soon as through using them.
5. Burn oily rags. Set oily mops in the open air. Never store easily flammable materials in closets.
6. Never start a fire with gasoline or kerosene.
7. If any garment cleaning is done at home, use nothing but non-flammable cleaner; never use gasoline or naphtha.
8. If gasoline or kerosene is kept on hand, keep only small quantities, in safety cans, OUTSIDE the house.
9. Clean chimneys and flues annually. Protect woodwork and other flammable parts near furnace or stove with insulation.
10. Place ashes in metal containers; dump ashes where they cannot set fire to anything.

Home Remedy

Although we are always wary of home medical cures, here is one that may tide you over until the busy doctor can get there. A painful earache can be relieved no end by roasting a raisin and binding it as hot as you can stand it in the ear.

HOMEMAKERS' SECTION

Kitchens for Farm Homes

By

RUBY M. LOPER

*Extension Agricultural Engineer
University of Nebraska*

"Your Home of Tomorrow", a war-born slogan, is more typically American than many of us realize. It implies that, as a free people, we *will* have homes "tomorrow". Homes which are of our own choosing and in which many improvements in equipment, materials and arrangement will be found. Freedom of thought and enterprise are pointing the way towards increased comfort, convenience and safety in our homes as well as in factories.

American farm families have carried a staggering load during these war years, in spite of a shortage of labor and equipment, and their job is not yet done. The need for food and more food is increasing and probably will continue to do so for some time. Farm women, old and young, have not only carried on their usual household tasks but have taken over a large part of the chores, usually done by men, and have spent long hours in the fields during the rush seasons. This in addition to their usual activities in gardening and poultry raising.

Those who were fortunate enough to have well arranged, well equipped kitchens found this increased load easier to carry. Every homemaker knows that the kitchen is her workshop and the numerous tasks peculiar to farm life make this workshop doubly important. With the present high level of income, farm families are planning many improvements for their homes just as soon as materials and labor are available. Some improvements will be possible before the war is over while others must be postponed. In order to avoid costly mistakes, many families are studying their houses with critical eyes and are planning their changes so that they may be done a step at a time. In this manner the completed remodeling will be satisfactory, will lighten the work load of the homemaker and will contribute to the health and happiness of all members of the family.

The principles of farmhouse design differ from those of urban house planning and influence the location of the kitchen and its arrangement. Chief of these are:

1. The farmhouse should face the entrance drive—not the highway past the farmstead. The farm drive is the farmer's street and such an arrangement encourages visitors to use the front entrance rather than the rear door.
2. The kitchen should be so located that its windows command a view of the entrance drive, the barns and lots.
3. The rear entry should be located and arranged so that house traffic may enter the rear door and pass into other parts of the house or down to the basement without going through the kitchen.
4. A first floor workroom, or utility room, handy to the rear entry and kitchen, will remove many of the "messy" tasks from the kitchen. In it may be placed the cream separator, the washing machine, a closet for work clothes, work surfaces, and even an extra sink and stove for use during butchering and canning seasons.
5. The men should have some place to wash, other than at the kitchen sink, when they come in from the fields, the barns or lots.

There are other factors to consider when remodeling or building new farm homes but these are the ones related most closely to the kitchens. It is sometimes impossible to incorporate all of them when remodeling, but all should be kept in mind and as many as possible introduced into the final arrangement.

The problem of facing the house towards the entrance drive sometimes seems impossible without major changes. Many clever schemes have been used, however, but will not be discussed in detail here. Oftentimes changing the front porch steps to the end of the porch and rearranging the sidewalks will accomplish the desired results with a minimum of expense.

Being able to see the entrance drive and the service buildings from the kitchen usually means just a change of window location. Occasionally the kitchen may not be located in the right position to permit such a view and should be moved to another part of the house. This does not mean that the room itself needs to be moved. Study-

ing the house with a detached attitude towards present room uses oftentimes shows that another room will serve better as a kitchen and that the present kitchen can be used better for other purposes.

Introducing a rear entrance hall that will direct traffic to the correct areas may mean a rearrangement of doors, the introduction of a hall or relocation of stairs. This is probably the most difficult change to make but here again actual remodeling jobs have shown that it often is possible. Hallways have been cut off of extra large kitchens, pantries have been turned into halls and, in some cases, the equipment within the kitchen has been rearranged to leave one end clear so that it may be used as a traffic way even though no wall separates it from the rest of the room.

Utility rooms have been gained by enclosing present rear porches, by using other rooms which are not now needed for their original purpose, by subdividing unusually large kitchens, or by adding on to the existing structure. When part of the original kitchen is used for this workroom, it can often be made to serve a double purpose—that of a utility room and a central rear hall.

A place for the men to wash can be included in the utility room. If space permits, one corner may be walled off to permit the installation of a lavatory and toilet. This toilet will save countless steps for the homemaker—particularly where there are small children in the family. Some method of heating will be necessary to prevent these fixtures from freezing in cold weather. In houses without central heat in this room, a small fuel-oil heater will answer the purpose. A tight foundation and insulated floor and side walls also will aid in weather protection.

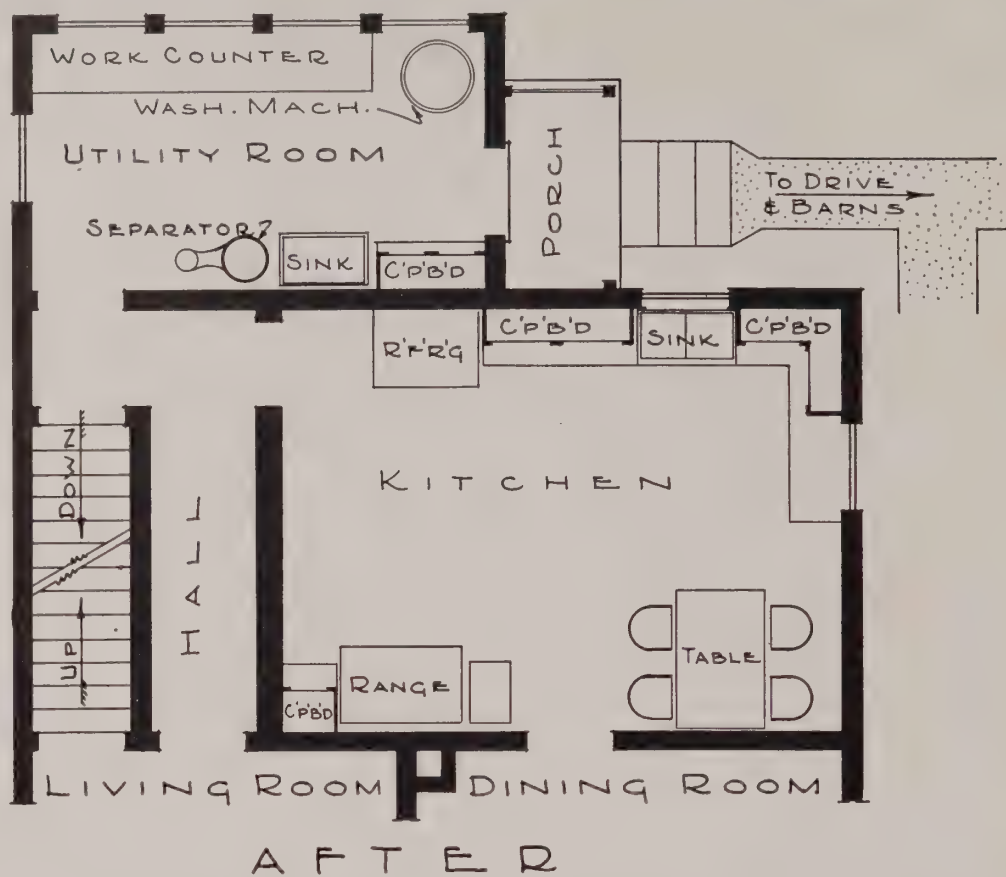
The following illustrations of actual remodeling jobs show how most of these factors were introduced into three Nebraska farm homes. It was impossible to incorporate all of the ideas into each one, but the owners are enthusiastic with the results they obtained for the money they invested. Before and after plans are shown to permit comparisons.

Job No. 1. Existing conditions: Dark rear porch, 5 doors in kitchen, pitcher

pump and sink without drain boards, no built-in cupboards or work surface areas, winding stairs leading up out of kitchen, traffic to rest of house cutting diagonally across kitchen, and kitchen too large. Three good features were: the easily accessible basement stairs, a well built chimney and a sound structure including the rear porch. The chimney contained only a single flue, however, which served both the furnace and the range thereby resulting in poor draft for both pieces of equipment in winter.

Conditions desired: A convenient, light utility room; a central rear hall; fewer doors in the kitchen; a double basin sink with water under pressure; built-in cupboards and work surfaces; easier, safe stairs leading up out of living room; and an upstairs bathroom. A means of providing pipes to and from the bathroom had to be considered when the other changes were being planned.

Note: Space for eating part of everyday meals in the kitchen was to be provided and location of a future electric range to be considered. An automatic water system was to be located in the basement. Sink could be placed where most convenient. Two adults and two small children in family.



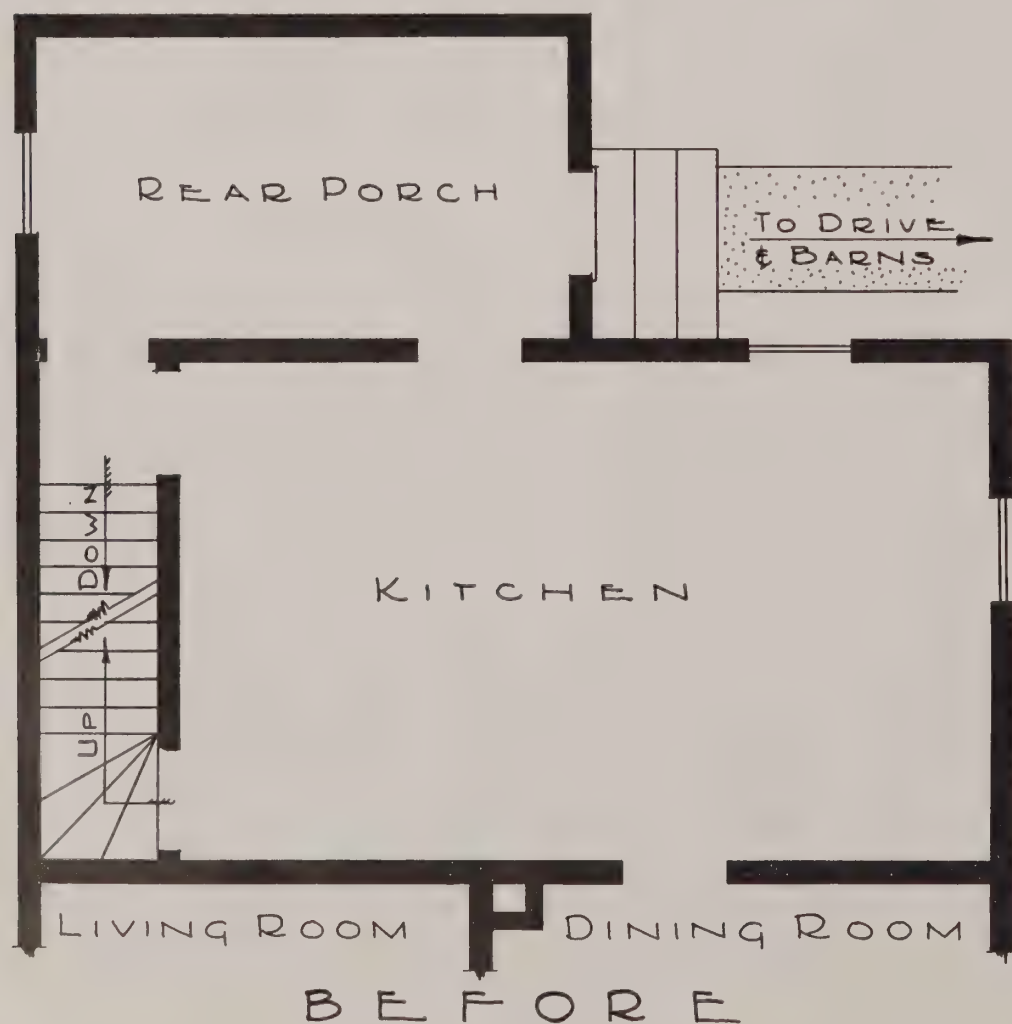
Comments: Most of the desired features were obtained. The pipes for the upstairs bathroom were incorporated in the new wall forming the hall. The

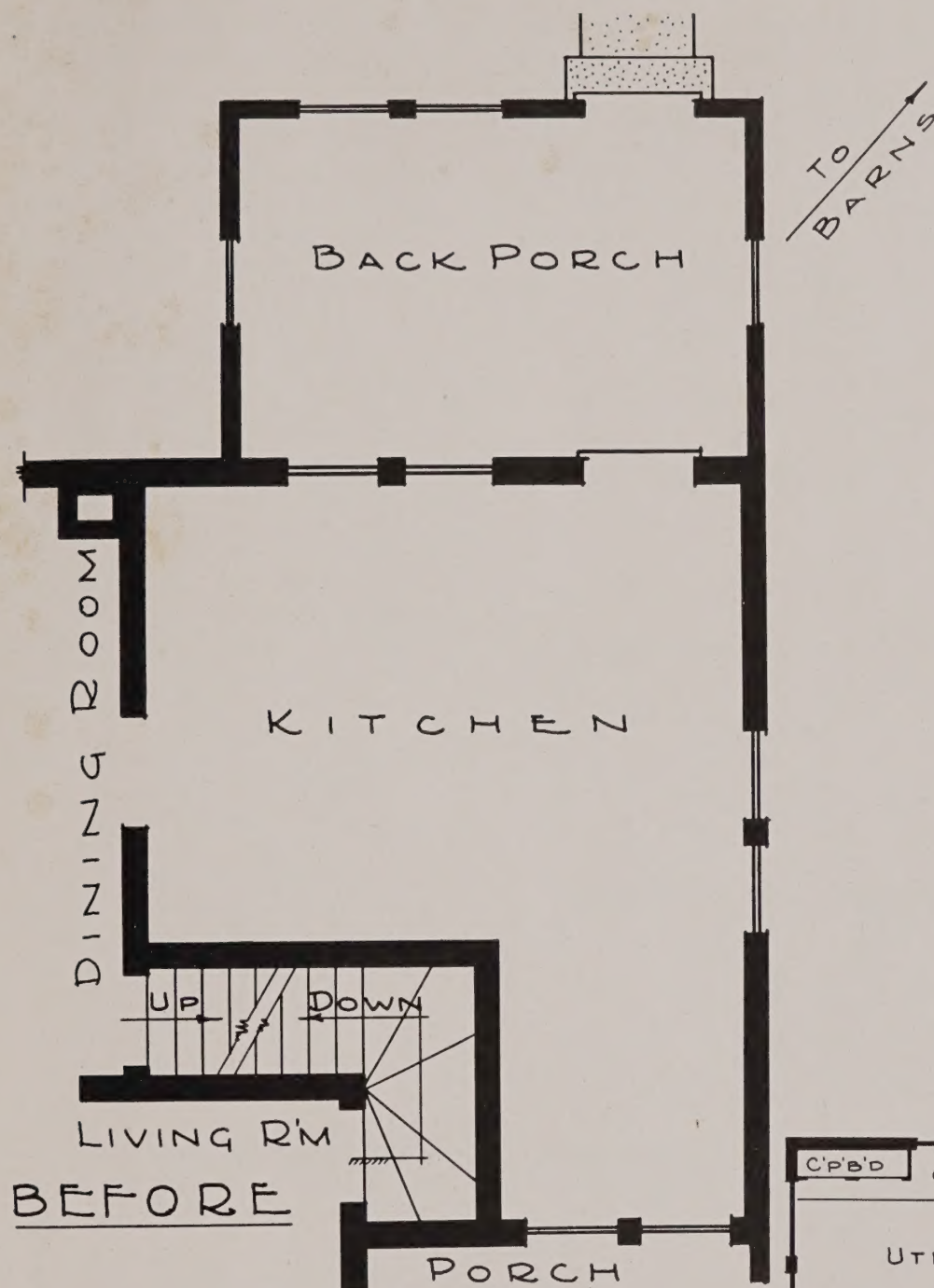
ceiling of this hall was lowered to 7 feet at one end to accommodate a stair landing and three final steps to second floor. No downstairs toilet was included nor a closet for work clothes. Wall hooks were provided for coats in the rear hall, thereby keeping them out of the kitchen.

Job No. 2. Existing conditions: Rear porch in poor condition, shape of kitchen detrimental to convenient arrangement of equipment, chimney in poor condition, stairs so located that access to basement from kitchen required going through dining room and living room, front porch in poor condition, no bathroom, no kitchen sink, insufficient kitchen cupboards and work surface areas, and no place for work clothes except in the kitchen.

Condition desired: A convenient, light utility room containing closet for work clothes and a place for men to wash; relocation of basement stairs convenient to kitchen and utility room; bathrooms on first and second floors; water under pressure at kitchen sink; built-in cupboards and work surface areas; more room in kitchen; and traffic way directly from utility room to rest of house.

Note: Seven adults comprised this family and all meals were eaten in the dining room. The house was structurally sound although the porches were in poor condition. The father and two oldest sons were good mechanics and





planned to do most of the work themselves. A new furnace had been purchased and the chimneys were to be rebuilt thereby permitting a change in location. High-line electric service had been provided and an electric refrigerator had been purchased. A wood-coal range was used but the possibility of an electric range later was to be considered.

Comments: Most of the desired features were obtained although no separate hall leads from the utility room to the rest of the house. By keeping the stairway wall free, however, traffic can pass directly into other rooms without interfering with the activities in the kitchen. The double flue chimney serves the kitchen range and a laundry stove in the utility room. The sink in this room serves a four-fold purpose; a place for the men to wash;

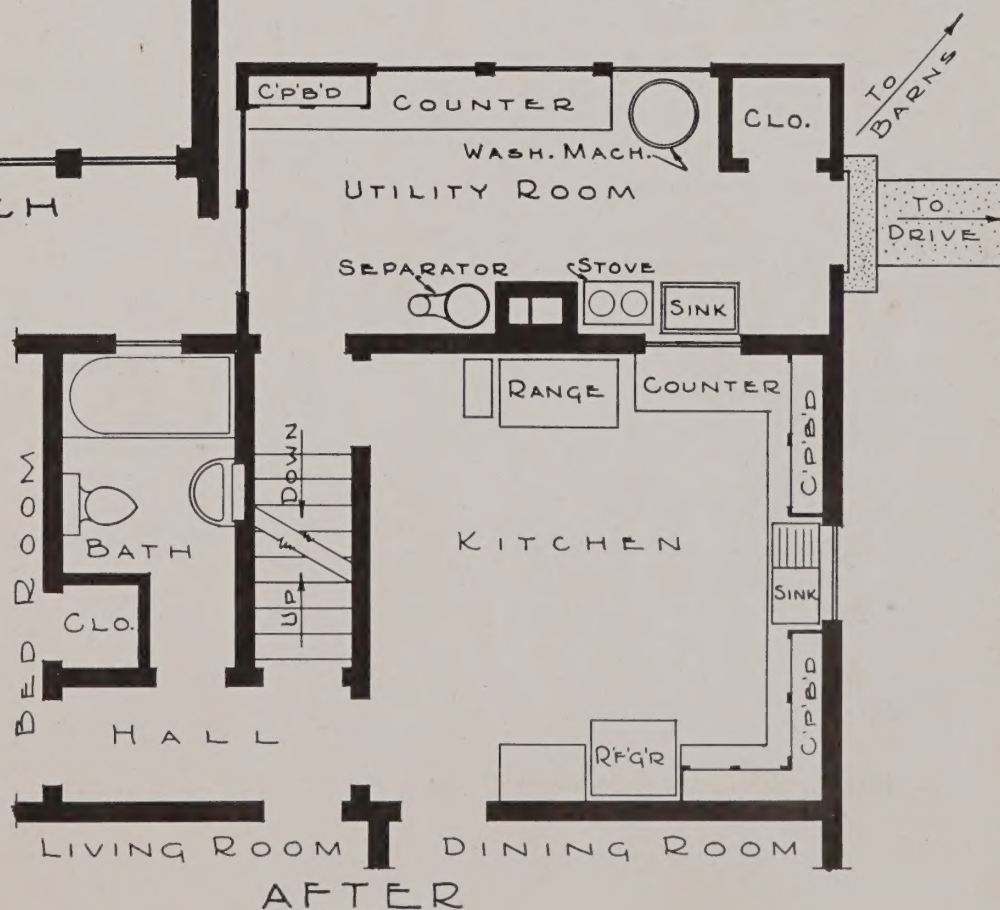
water supply on wash days; a place to scrub vegetables as they are brought in from the garden; and a convenience during canning and butchering seasons.

Job No. 3. Existing Conditions: Kitchen located in large run-down lean-to, dining room too large, no sink or water under pressure, no closet for work clothes, inconvenient basement stairs, and traffic passing through center of kitchen.

Conditions desired: Reduce size of present lean-to and rebuild for use as utility room; convert present dining-room into a combination kitchen and dining-room; relocate basement stairs; provide first floor bathroom and second floor half-bath; install built-in cupboards, work surfaces and sink in kitchen; direct traffic from utility room to rest of house; and provide closet for work clothes.

Note: Three in family, high-line service available, main part of house in good condition, water system to be in basement.

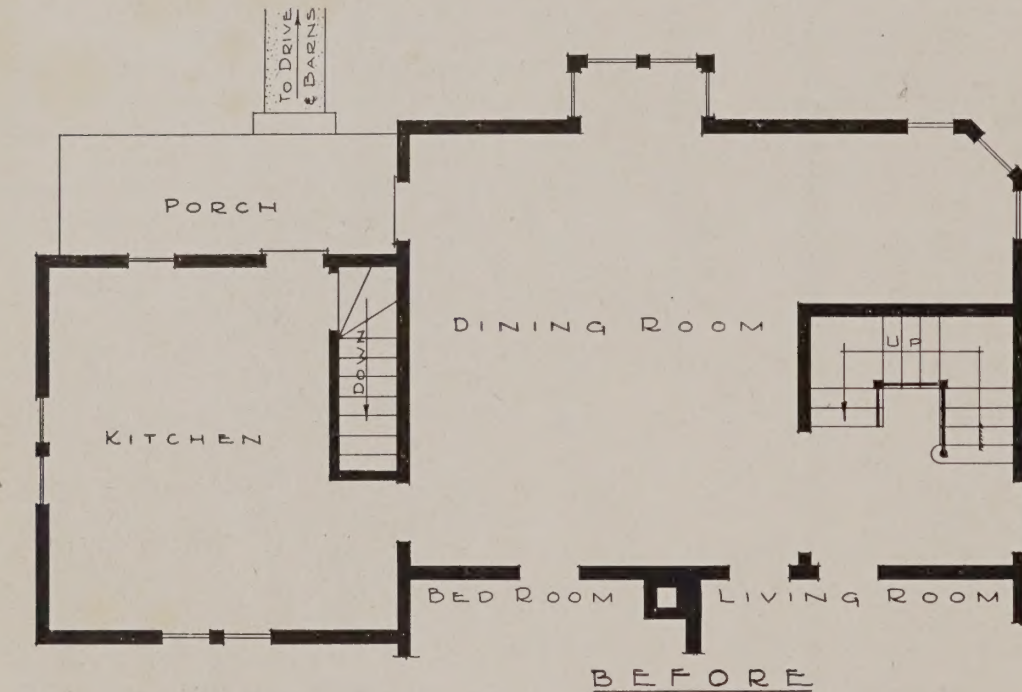
Comments: The kitchen itself is smaller than usually found in farm homes but for this family, is adequate. Careful arrangement of equipment reduced the homemaker's work and the storage space seems ample. The dining area is light and cheerful. Note the table and chairs rather than the bench-type nook which is often recommended but seldom approved by those who use it.



Major changes such as shown in these three examples are not always needed or desired but such possibilities should be kept in mind when studying rearrangements. Possible changes in the rest of the house can then be made later without having to undo anything already done.

The arrangement of equipment within the kitchen is governed by two factors—the structure itself and the logi-

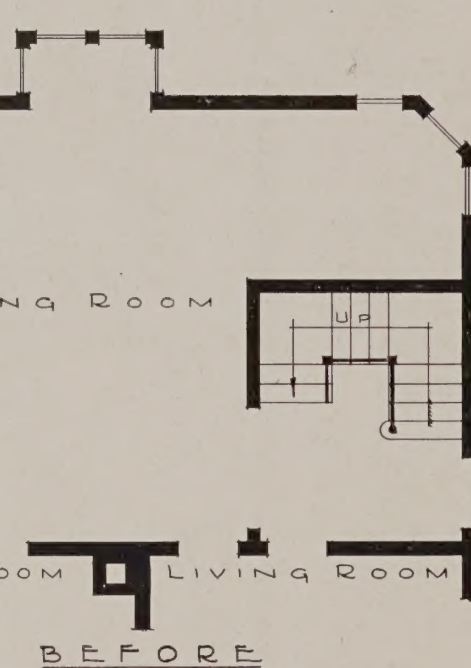
cal order of kitchen work. As has been shown, varying degrees of structural changes are often needed. Even when no great change is contemplated two features need careful study. These are: present location of doors and windows, and location and condition of chimney if a wood-coal range is to be used.



cal order of kitchen work. As has been shown, varying degrees of structural changes are often needed. Even when no great change is contemplated two features need careful study. These are: present location of doors and windows, and location and condition of chimney if a wood-coal range is to be used.

Many chimneys now in use are definite fire hazards. Rural fire loss studies show that defective chimneys are responsible for a large percentage of farm house fires. A good chimney extends down to and rests upon a solid foundation of its own and is lined with a flue lining. Rebuilding unlined, bracket-type chimneys is good fire prevention insurance. When chimneys need to be rebuilt some thought given to their correct location may mean the difference between a convenient and a poorly arranged kitchen. Chimneys located on inside walls usually result in greater fuel economy than those on outside walls.

Space does not permit a detailed discussion of kitchen cupboard arrangement. Numerous publications dealing with this subject are available from commercial concerns and agricultural



try and dairy products is a task usually not done in town.

Following are a few general principals which merit consideration in selecting and arranging farm kitchen equipment:

1. Adequate storage space for staples, perishable foods, commercially canned foods, cleaning supplies,

dishes, cutlery, pots and pans, linens, and infrequently used equipment.

2. Supplies and equipment arranged in order of jobs to be done.
3. Work area surfaces and sink installed at heights which prevent undue stooping. The height of each homemaker should be considered since she spends a large part of each day in her kitchen. Satisfactory working heights vary for different individuals.
4. Work surfaces which will stand hard usage and are non-absorbent.
5. Adequate toe space under all work counters.
6. Smooth cupboard exteriors which are easily cleaned.
7. Cupboards not too deep and shelves which are adjustable.
8. Space for large or odd-shaped articles such as pressure cookers, canners, mixers, waffle irons, coffee makers, roasters, etc.
9. Door latches which work easily, installed in handy locations.
10. Dustproof drawers which slide easily and are not too deep. Divided drawers for cutlery.
11. Smooth tilting or swinging bins for flour. Good balance is important to prevent strain and accidents.

12. Bread boards conveniently located but not over cutlery drawer or flour bin.
13. Refrigerator of adequate size. Pre-war models were made with left and right hand doors and no doubt will be again. Location of refrigerator will determine which swinging will be most convenient.



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